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The co-emergence of Spanish as a second language and individual differences: A dynamical systems theory perspective

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The co-emergence of Spanish as a second language and individual differences: A dynamical systems theory perspective

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Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

May, 2012

Dedicated to my family

Acknowledgements

I would, first and foremost, like to thank my wife, Heather, and my children, Aidan and Julia for their support, patience and encouragement. I have very fond memories of trying to write while being dressed up, climbed on or having my picture drawn – those moments kept me sane. My parents instilled a love of school and learning in me at a very early age, and my father, James, has cheered me on through my years as a graduate student.

I feel as though I have grown both intellectually and spiritually during my time at the University of Texas. I am very fortunate to have a committee of mentors whom I admire and who have taught me many valuable lessons. Dr. Blyth has been my mentor and my inspiration since my first day on campus, always giving me frank and useful advice when I needed it most. He taught me that following my own intellectual curiosity is just as valid a pursuit as any. Dr. Nishida taught me that a theoretical grounding in any discipline is always the best place to start. Dr. Salaberry inspired me to think more critically and creatively. Taking his course on theory building opened my eyes to the need to constantly question the epistemological underpinnings of our beliefs and sparked my interest in DST. Dr. Streeck taught me that the study of linguistics was not necessarily an end, but rather a potential point of departure for the study of the myriad, fascinating aspects of human interaction and communication. Finally, I cannot thank Dr. Koike enough for her tireless support. She taught me the 'nuts and bolts' of applied linguistics and helped me wade through a sea of literature. Her work on expectations inspired my own interest in the interface between talk and psychology and I'll be eternally grateful for her mentorship.

My hope is that all of these lessons I have learned are reflected in this dissertation.

The co-emergence of Spanish as a second language and individual differences: A dynamical systems theory perspective

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Dynamical Systems Theory (DST) (De Bot, Lowie, & Vespoor 2007; Larsen-Freeman 1997, 2007; Larsen-Freeman & Cameron 2008; Dörnyei 2009; and van Lier 2000) represents a scientific paradigm shift derived from the fields of physics, engineering and theoretical mathematics that attempts to solve real-world scenarios that do not respond to scientific reductionism, otherwise known as 'analysis'. The purpose of this dissertation is to (re)frame foreign language learning/use as a dynamical process that that involves interplay among what Dörnyei (2009) terms the *language*, the *agent* and the *environment*. More specifically, this dissertation presents a quasi-experimental, psycholinguistic study that looks at the interface between language (in this case the talk that resulted from NS-NNS interactions) and agent (as defined by a set of personal traits, or Individual Differences [IDs], including motivation, attitudes, personality and aptitude) in order to answer the research question: Do IDs vary in conjunction with language learning/use, and if so, how?

Eight tutored Spanish learners were followed over the course of 16 weeks during which time they participated in 8 chat sessions with a native Spanish-speaker. Their ID

profiles were measured immediately before and after each session and sessions with significant pre- to post-session ID shifts were analyzed to determine to what extent such shifts correlated with certain types of talk and/or think-aloud sequences.

Results indicated that all participants' pre- and post-interactional ID profiles fluctuated measurably and significantly, even within the span of a single interaction. Moreover, those sessions with significantly positive ID shifts were qualitatively different in terms of language-related episodes (LREs), conversation management/pragmatic markers, and metacognition from those with significantly negative ID shifts. Other unexpected findings revealed, for example, that LREs (especially NS-initiated LREs) negatively impacted motivations and attitudes and, therefore, the language-learning process itself.

Taken together, the results of this study indicate that the agent's IDs and their (inter)language *co-emerge*; that is to say, they evolve simultaneously and in response to one another. Moreover, this study suggests that DST can indeed be quasi-experimentally applied to the study of SLA, thus necessitating further development in DST-oriented methodologies and research questions.

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Chapter 1: Introduction

1.1 INTRODUCTION

Dynamical Systems Theory (DST)[1] (De Bot, Lowie, & Vespoor 2007; Larsen-Freeman 1997, 2007; Larsen-Freeman & Cameron 2008; Dörnyei 2009; and van Lier 2000) represents a scientific paradigm shift derived from the fields of physics, engineering and theoretical mathematics that attempts to solve real-world scenarios that do not respond to scientific reductionism, known as analysis. It is a particularly appealing paradigm for the social sciences, not only because of its growing interdisciplinary synergy, but also because it embraces notions of chaos and complexity with which social scientists have long grappled in applying linear theoretical models to actual human behavior. Those who are as of yet unfamiliar with DST may be surprised to come across titles like *The end of certainty: time, chaos, and the new laws of nature* (1997), *From being to becoming* (1980) and *Order out of chaos: Man's new dialogue with nature* (1984), and discover that they are not the work of some obscure philosopher, but rather of the Nobel-prize winning thermodynamicist, Ilya Prigogine. Not only do these titles reframe (hard) scientific inquiry as dialogic, which may explain its appeal to the humanities, but they also bring up two very powerful recurring concepts: (1) a growing awareness of the complexities of real-world phenomena; and (2) the conviction that such complexities can no longer be ignored in scientific inquiry. In Prigogine's (1997) own words, "[t]he more we know about our universe, the more difficult it becomes to believe in [classical] determinism" (155).

[1] See Appendix A3 for a list of acronyms.

I will argue that second language learning, like thermodynamic heat transfer, involves complex, dynamical, adaptive, open, far-from-equilibrium systems that are subject to periods of emergent, self-organized order and periods of chaos, which drive change over time. Moreover, I will argue that the reductionist study of language has encountered the same fractal inconsistencies as the study of physics and applied mathematics, and is therefore subject to the same shortcomings of linear analyses in our non-linear world. A similar account of second language learning has been previously advanced in applied linguistics (De Bot, Lowie, & Vespoor 2007; Larsen-Freeman 1997, 2007; Larsen-Freeman & Cameron 2008; Dörnyei 2009; van Lier 2000). Moreover, other SLA paradigms, such as the sociocultural paradigm (cf. Lantolf 2000), share similar ends in their push to expand the field of inquiry and include greater contextual factors, thus embracing the complexity of language.

Dörnyei (2009: 240), in particular, admits that the current challenge for the social sciences is to develop methodologies for conducting empirical studies in the DST vein. My aim is to respond to this challenge by piloting a DST-inspired methodology and ascertaining if it is capable of shedding new light on the ecology of SLA. More specifically, I look to the interaction between those traits that define the individual learner and the language learning process, determining to what extent such variables *co-emerge*; that is, constantly respond to changes in one another. Many would intuitively agree that the type of person we are dictates the way we talk. At issue here is also the possibility that the way we talk bears upon the type of person we are. Dörnyei (2005, 2009), among many others, depicts our persona as 'stable', 'enduring' and 'systematic'. I argue that all of those variables that distinguish us from one another are subject to change, especially when confronted with unusual circumstances, such as those involved in learning a foreign langauge.

The remainder of this chapter is dedicated to (1) defining the basic tenets of DST (Sections 1.2 and 1.3), (2) illustrating why DST provides an ideal framework within which to study and model SLA (Section 1.4), (3) situating DST relative to mainstream generative linguistics (Section 1.5), and (4) discussing how DST-motivated research compels us to reconsider institutionalized divisions between applied linguistics and differential psychology, for example, as well as notions that the relationship between the individual and the language learning process is unidimensional and unidirectional (Section 1.6 – 1.7).

1.2 DST Principles: Certainty, Reductionism, and Linearity

Peitgen, Jürgens and Saupe (2004) offer a very cogent historical sketch of chaos and complexity theory, illustrating science's turn away from 'classical determinism' (i.e. the premise that in knowing the present state of affairs, the future can be precisely calculated) to uncertainty. They credited Werner Heisenberg with leading the paradigm shift in the natural sciences. Indeed, according to Peitgen et al. (2004), Heisenberg realized that it was impossible to grasp the present fully, and thus impossible to predict the future. Thus was born the idea of weak causality (i.e. similar causes yield similar consequences in nature). Some forty years after Heisenberg, in the 1960's, Edward Lorenz, armed with findings from studies in hydrodynamics and meteorology, argued that even with a perfect knowledge of the present, the future would still be uncertain.

> Thus, Heisenberg's response to deterministic thinking was also incomplete. He concluded that the strong causality principle is wrong because its presumptions are erroneous. Lorenz has now shown that the conclusions are also wrong. Natural laws, and for that matter determinism, do not exclude the possibility of chaos. In other words, determinism and predictability are not equivalent. And what is an even more surprising finding of recent chaos theory has been the discovery that

> these effects are observable in many systems which are much simpler than the weather…
>
> Moreover, chaos and order (i.e. the causality principle) can be observed in juxtaposition within the same system. There may be a linear progression of errors characterizing a deterministic system which is governed by the causality principle, while (in the same system) there can also be an exponential progression of errors (i.e. the butterfly effect) indicating that the causality principle breaks down.
>
> In other words, one of the lessons coming out of chaos theory is that the validity of the causality principle is narrowed by the uncertainty principle from one end as well as by the intrinsic instability properties of the underlying natural laws from the other end. (Peitgen et al.:14)

Baranger (n.d.) looked at Chaos Theory, which is intimately related to DST in that it seeks to describe the apparently chaotic though deterministic behavior of certain dynamical systems. He characterized its induction into physics as a somewhat unwelcome transition. Twentieth-century physics, it seems, was preoccupied with quantum mechanics, relativity and their enormous implications. They heavily relied on calculus, which was nearly simultaneously developed by Newton and Leibniz in the 17th century. Prior to calculus, geometry was capable of analyzing lines as well as rectilinear and some limited curvilinear shapes. With the advent of calculus, however, any curve, indeed, any surface, could be analyzed, provided it is sufficiently smooth. In very simple terms, this procedure is done by treating a curve as a set of infinitesimally small line segments. As these segments become smaller and smaller, the representation of the curve becomes more and more accurate. Again, for this analysis to hold, the curve must be smooth, meaning that under increasing magnification, a given segment of the curve retains its shape. This assumption is not trivial, but as the use of calculus gained momentum, it was all but ignored. This approach to solving complex problems through reductionism now pervades scientific ‘analysis’.

> After many decades of unbroken success with analysis, theorists became imbued with the notion that analysis was the way of the world, that all problems would eventually yield to it, given enough effort and enough computing power. This idea was not expressed explicitly; it was unconscious. But it pervades most of the science of the twentieth century. It is reflected in the choices made by university curricula and by the textbooks. The two great physical theories of the early twentieth century, Relativity and Quantum Mechanics, are both totally rooted in analysis. This idea of the invincibility of analysis was all the more powerful for being unconscious. People forgot that there were initial assumptions. The conditional truths became absolute truths. (Baranger n.d.:3-4)

In fact, engineers and mathematicians had long known that there was a large set of problems that did not respond to calculus, which led to the conclusion that smooth curves were the exception and not the rule. Formal Chaos Theory, therefore, comprises that set of mathematical principles to which calculus does not apply.

We can most easily observe chaos operating in two dimensions: time and space. Chaos operating in the spatial dimensions produces *fractals*, which are generally defined as the antithesis of smooth curves; that is, forms that do not become simpler upon increasing magnification. Among the better-known examples of mathematical fractals is the 'Mandelbrot set', which is widely represented in graphic art and in countless websites that give an animated view of this set under increasing magnification. Portions of the fractal's curves that appear somewhat smooth from a distance reveal fantastic shapes upon closer magnification. In fact, there is no degree of magnification (or reduction) that can simplify the shape. There are always infinite patterns within patterns (see Figure 1 below).

Fractals are not merely mathematical concoctions or stuff of screen savers; they exist in the physical world as well. To illustrate, Mandelbrot (1967, 1983) asked, "How long is the coast of Britain?" The answer to this question is not as obvious as it seems and is ultimately a question of scale. One could take an average-sized map of Britain and place a string along the coastline, then stretch it out and measure it against a scale. But a

larger map would reveal that the coast is full of coves and inlets that were not visible in the lower-resolution map. Taking the same string and measuring it on a larger map, this

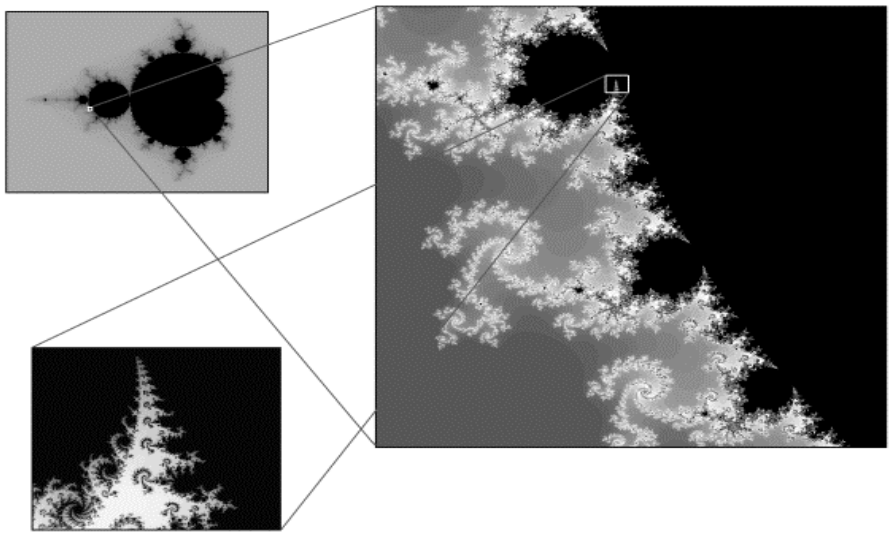

Figure 1: Illustration of the Mandelbrot set at various levels of magnification[2]

time taking into account the coves and inlets, would yield an even longer length. An even larger map would reveal coves and inlets within the coves and inlets, and the same exercise would yield an even longer length. Walking the coast of Britain with a very long string would yield an even larger measurement, and it would not end there. A magnifying glass would reveal that even the grains of sand on the beaches form miniature 'coves' and 'inlets'. The conclusion of this thought exercise is that, as the coastline of Britain becomes infinitely magnified, its length becomes infinitely long. This fact does not even account for the time factor in the fluctuation of tides.

> The result is most peculiar: coastline length turns out to be an elusive notion that slips between the fingers of one who wants to grasp it. All measurement methods

[2] From Wahl, B. (1994). Exploring Non-Linear Fractal with MandelMovie. *Exploring Fractals on the Macintosh,* Chapter 5. Retrieved from http://www.wahl.org/fe/HTML_version/link/FE5W/c5.htm

> ultimately lead to the conclusion that the typical coastline's length is very large and so ill determined that it is best considered infinite. Hence, if one wishes to compare different coastlines from the viewpoint of their extent, length is an inadequate concept. (Mandelbrot 1983: 25)

Fractals can likewise be observed in the ontogeny of all species. According to Thelen and Smith (1996), an organism's development could be simultaneously characterized as both predictable and chaotic.

> The grand sweep of development seems neatly rule-driven. In detail, however, development is messy. As we turn up the magnification of our microscope, we see that our visions of linearity, uniformity, inevitable sequencing, and even irreversibility break down. What looks like a cohesive, orchestrated process from afar takes on the flavor of a more exploratory, opportunistic, syncretic, and function-driven process in its instantiation. (Thelen and Smith 1996: xvi)

The problem with the 'grand sweep' perspective is that it is tempting, though theoretically unsound, to equate patterns with predetermined outcomes because patterns are epiphenomenal and causality in complex systems is difficult if not impossible to map fully. Thelen and Smith (1996) illustrates this point by tracing the logic of the nature versus nurture debate in mental development, arguing that nature and nurture are ambiguous concepts at best. If one maintains that the mind is genetically derived, one must first explain how it can arise from neural impulses, then one must explain how sequential, one-dimensional DNA code can beget functionally-specific, three-dimensional neural tissue. At each step, there is a need to formulate a new set of rules, which, in turn, spawns a whole new set of issues to be resolved. This theoretical 'buck-passing' has no inherent end point, according to Thelen and Smith.

> In essence, genetic determinism just sidesteps the question of origins and dumps the problem onto the laps of the evolutionists, who must account for behavioral novelty. (Thelen and Smith 1996: xv)

The same critique applies to those who claim that mental structure is environmentally derived, and especially to those who claim that both nature and nurture

determine mental structures. Neither of these constructs can be fully operationalized nor fully differentiated from one another; they are idealized reality. Thus, it is one thing to observe processes in motion and guess at potential consequences based on previous, though limited experience – to spot "propensities" as Popper would say – but quite another to objectify and isolate these forces from their larger, intertwined ecology, for they are far too elusive. I would liken it to observing two adjacent eddies in a stream. One might be tempted to see them as different structures, even though the same water molecules might pass through both. It is a fruitless exercise to describe one as though it has no relation to the other, and even less productive to scoop one up and try to examine it in isolation because it would instantly disappear. Eddies, like the constructs of nature and nurture, are processes or patterns of energy flow within a larger dynamical system: recognizable but indefinite and, ultimately, unreliable. I would argue that the same lesson could be applied to the study of language development and that terms such as *interlanguage*, *end state*, *grammar*, *aptitude*, *motivation*, *proficiency*, *learner variables* and *acquisition* should be viewed as processes rather than discrete features that remain constant from one instant to the next, a premise that I will argue in greater detail in the following chapter.

1.3 DST Principles: Fractals in Space and Time

One feature that can be used to identify dynamical systems is fractals. As Baranger (n.d.) points out, fractals will often exhibit patterns that are self-similar at different scales. This fact is true of some ferns and sand dunes, for example. The human body does not show repeating patterns at all scales (although it may at some scales), but it is fractal nonetheless. As one zooms in on a small section of the body, the view does not

get simpler, but instead reveals cells, which reveal organelles, and eventually DNA and atoms, which in turn reveal protons, neutrons and electrons, which are composed of quarks. There is no reason to believe that there are not even finer elemental particles – we are limited only by our technology.

Chaos acts not only in space, but also in time, as Baranger claims. The signature of chaos in the time dimension is a dynamical system's (i.e. a system whose variables change over time) sensitivity to its initial conditions. This fact means that two systems that are somewhat, but not exactly, similar will take two divergent trajectories. This idea was first advanced by Edward Lorenz in what he called the 'butterfly effect'. It is possible that a butterfly flapping its wings in the Caribbean can spark a typhoon in Asia. The absence of that butterfly in an otherwise identical system would have very different outcomes.

> Sensitivity to initial conditions is the death of reductionism. It says that any small uncertainty that may exist in the initial conditions will grow exponentially with time, and eventually (very soon, in most cases) it will become so large that we will lose all useful knowledge of the state of the system. Even if we know the state of the system very precisely now, we cannot predict the future trajectory forever. We can do it for a little while, but the error grows exponentially and we have to give up at some point. Does that remind you of weather prediction? Indeed: Lorenz was a meteorologist. (Baranger n.d.: 7)

1.4 Does Language Learning/Use Involve Dynamical Systems?

The preceding argument was intended to point out that chaos and complexity as it applies to dynamical systems within the hard sciences represents a very momentous paradigm shift, which can be viewed as detrimental to reductionism and classical determinism. As this new paradigm spreads from the hard sciences to the social sciences

and even the humanities, the question arises: how does DST pertain to (applied) linguistics?

Let us consider the fit between DST and human language. Baranger (n.d.) gives a very cogent taxonomy of complex dynamical systems. The requirements are as follows:

1. Complex systems contain many constituents interacting nonlinearly.
2. The constituents of a complex system are interdependent.
3. A complex system possesses a structure spanning several scales.
4. A complex system is capable of emerging behavior.
5. Complexity involves an interplay between chaos and non-chaos.
6. Complexity involves an interplay between cooperation and competition.

I will treat each one of these criteria individually with respect to (applied) linguistics, taking many cues from Larsen-Freeman and Cameron (2008).

1.4.1 Complex systems contain many constituents interacting nonlinearly.

Baranger (n.d.) points out that nearly all non-linear systems that have three or more parameters are prone to some form of chaos. Language production is subject to countless parameters, certainly more than three. Nearly half a century ago, Labov (1966) began mapping the parameters that figure in linguistic variation and change. His work would serve as the cornerstone for the field of sociolinguistics, bringing individual differences (such as age, race, place of residence, identity, etc.) to center stage. Schegloff (2007) took a different perspective, discussing constraints that are posed by conversational structure and turn-taking conventions. Firth and Wagner (1997) maintain that a broad range of factors, from topic to interlocutor to task, influences a speaker's choice of forms. This idea of variable (context dependent) linguistic competence stands

in stark contrast to Chomskyan generativism, but this contrast does not mean that both paradigms do not recognize the importance of contextual variables on language production. Generativism simply abstracts grammatical competence (I-language) from production (E-language) and chooses to focus on the former and not the latter. The logic behind assigning competence and performance to separate cognitive domains is discussed in Section 1.5. For now, it can at least be said that Baranger's first criteria is satisfied at least for observable language, since the general consensus among linguists is that language production is subject to a multitude of contextual factors, both speaker-internal and external. Thus, it can be generally agreed that Baranger's requirement of more than three parameters is met and exceeded.

1.4.2 The constituents of a complex system are interdependent.

Larsen-Freeman and Cameron (2008) clearly speak to the complex relationship between language and its contextualizing factors, maintaining that it is developed in, adapted for, shaped by, and applied in context. Moreover, context selects the linguistic action to be performed in terms of how well suited it is to the here and now (69).

Minsky (1986) and those who study the ecology of cognition insist that Cartesian dualities between individual thought and social context, indeed between mental process and products, are inseparable.

> [I]t makes no sense to speak of brains as though they manufacture thoughts the way factories make cars. The difference is that brains use processes that change themselves – and this means we cannot separate such processes from the products they produce. In particular, brains make memories, which change the ways we'll subsequently think. (Minsky 1986: 288)

Iterative processes in which the outcome of one process becomes the input for subsequent processes is a hallmark of dynamical systems and is thought to be one of the

means by which order emerges from chaos. Much recent research in neural network modeling rely upon iterative processes, and Widjaja (2000), for example, cites neuroanatomical and physiological evidence that points to the existence of recursive networks in the cerebral cortex, which is responsible for higher cognitive functions. This evidence lends further support to the notion that mental processes and products are inextricably intertwined.

1.4.3 A complex system possesses a structure spanning several scales.

Utterances can be examined at the level of ongoing (historical) conversations, or what Gee (2005) calls "big C" conversations; they can be studied at the level of discourse, turns, phrases, words, sounds, and so on. Each one of these scales reveals a different realm of complexity, making language unquestionably fractal.

1.4.4 A complex system is capable of emerging behavior.

Emergent behavior in its simplest terms arises out of the interaction between various (sub-) systems but cannot be fully described or understood in terms of its components. Bates et al. (1998:590) illustrate this point quite clearly using a soap bubble metaphor: The fact that soap bubbles are spherical cannot be explained solely in terms of the soap, the water, or the boy who blew the bubbles. Indeed, they are a make-do solution to the problem of achieving the maximum volume with the minimum surface area.

To give a few more examples, a traffic jam can remain stable even though different cars enter and eventually pass through. Thus, to study the movements of a single car would not capture the dynamics of the traffic jam (Larsen-Freeman & Cameron

2008). The same could be said for pointillist paintings (looking at individual dots does not capture a complete image) and schools of fish (looking at the distance one fish maintains from another does not capture the shimmering collective patterns that confuse predators).

It is important to keep in mind that emergent patterns of order are always in flux.

> Humans 'soft assemble' (Thelan and Smith 1994) their language resources in order to respond in an intentional way to the communicative pressures at hand. As they do so, patterns emerge, such as those language-using patterns that manifest in linguistic corpora. However, performance stabilities arising from the dynamics of language use are transformed with further usage (Bybee 2006). (cited in Larsen-Freeman and Cameron 2008: 6-7)

1.4.5 Complexity involves an interplay between chaos and non-chaos.

The premise that complexity involves an interplay between chaos and non-chaos explains how complex dynamical systems can exhibit both stability and continual evolution. The agent of change is chaos, but utter chaos would result in an incomprehensible linguistic system. Combs (1995) makes this point on the nature of consciousness through his study of mood cycles.

> [M]oods can oscillate in a regular and predictable rhythm over the course of the day. Such a pattern, however, could not last indefinitely without perturbations contributing to more chaotic periods of activity. Moods are an obvious example, but there is no reason not to suspect that functions such as memory, thought, dreams, and general arousal do not also exhibit periods of constant or rhythmatic activity, and other periods of more chaotic change. If this is correct, then the overall process fabric of consciousness would likewise be expected to exhibit periods of calm, periods of more or less regular oscillation, and pronounced periods of chaotic activity. (retrieved online, no page numbers given)

Martinet (1955) sees a language as subject to two opposing forces. On one hand, people want to express themselves with the minimal possible effort (chaotic tendency) but need to distinguish linguistic forms in order to be understood and accepted (non-

chaotic tendency). Larsen-Freeman and Cameron (2008) propose a similar concept in language innovation.

> The density of novel expressions in the fast-changing speech of adolescents must be poised at some critical point that just avoids comprehension problems on the part of interlocutors while conveying the speaker as suitably 'cool'. (Larsen-Freeman and Cameron 2008: 62)

1.4.6 Complexity involves an interplay between cooperation and competition.

Baranger (n.d.) explains that the interplay between cooperation and competition involves an interaction between scales, where cooperation at a certain scale may foster competition at a larger scale. This interaction might be seen in emergent grammar where a linguistic subsystem organizes around a particular grammatical form, which in turn competes with previously learned conversational chunks, resulting in a 'U-shaped' learning curve (Kellerman 1985).

It therefore appears that language/language learning/language change fits nicely into the complexity paradigm. This theory carries the weight of research stemming from multiple disciplines, which gives it the potential of opening a dialog among once disparate fields of study. Complexity is not strictly compatible with a purely positivist paradigm because only probable short-term patterns and not definitive outcomes can be predicted, nor is it compatible with linguistic theories that distinguish between competence and performance. On the other hand, it is largely compatible with emergentism, connectionism, emergent grammar, cognitive linguistics, etc. (see Section 1.5 for a more in-depth discussion on this matter).

Besides being complex, linguistic systems are open, meaning that they are sustained by energy that comes from outside the system. They can also be considered

far-from-equilibrium. If the sun were suddenly to stop transmitting energy to the Earth, we would die and eventually disintegrate and our languages would cease to exist. This hypothetical situation would be closer to a state of equilibrium. Humans and human thought can only exist in a system that is not in equilibrium. Another system that is open and far-from-equilibrium is the tiny whirlpool that forms in a bathtub as it drains. As long as water (=potential energy) is added to the tub at the same rate at which it drains from the tub, the system remains roughly stable. Once the inflow stops, the tub drains completely, and the eddy eventually falls into complete chaos; then greater equilibrium is achieved when the tub is empty.

1.5 DST Principles and Chomskyan Generative Linguistics

It seems useful to spend some time situating DST in relation to Chomskyan linguistic philosophy, in part because the two concepts appear at first glance to be at odds with one another, but even more importantly because Chomsky's work provides the context and the foundation for the very study of modern linguistics, making even those who oppose him in some way indebted to him. Indeed, Holland (1992: no page number given) echoed the words of the *Encyclopedia Britannica* that still ring true today:

> The effect of Chomsky's ideas has been phenomenal. It is hardly an exaggeration to say that there is no major theoretical issue in linguistics today that is debated in terms other than those in which he has chosen to define it, and every school of linguistics tends to define its position in relation to his.

DST is a phenomenon of the late 20th century, which would explain why generative linguistics does not address it directly, as it did Skinner's theories on Behaviorism. Still, the epistemological underpinnings of generative linguistics have been

very cogently articulated by Chomsky himself, thus making it possible to assess the fundamental compatibility of the two paradigms.

Horgan (1996) chronicled a very interesting personal interview with Chomsky in which he gave his views on the limitations of science. Chomsky asserted that all animals, including humans, operate within a limited cognitive framework. Rats, for example, can learn to navigate a maze in which they are required to turn left at every second fork; however, they are incapable of learning to navigate a maze that requires a left turn at every fork corresponding to a prime number. Thus rats can count to two, but the concept of prime numbers (which may seem trivial to humans) lies beyond a rat's cognitive grasp. It follows that humans also have cognitive limits beyond which they are incapable of finding solutions that might, again, seem trivial to beings of higher mental capacity.

Chomsky thus divided human inquiry into 'problems' and 'mysteries'. Problems are those questions which we may potentially resolve through science, whereas mysteries are those questions for which we will never find a definitive answer and for which science is utterly useless. Science, according to Chomsky, has given us "a lot of understanding now about how human languages are more of less cast in the same mold, what the principles are that unify them and so on" (Horgan 1996:152), but it has not offered us much, if any, insight into the nature of consciousness or the creativity that underlies language. These mysteries remain resistant to human understanding. Chomsky therefore rejects the idea that science can provide us with a theory of everything, leaving us to settle for merely a "theory of what (we) know how to formulate" (Horgan 1996:152).

This epistemological stance is clearly reflected in Chomsky's distinction between I-Language (= "problem") and E-Language (= "mystery"), but both suffer from the same logical fallacy due largely to the fact that neither I-Language, E-language, 'problems',

nor ‘mysteries’ constitutes a stable, mutually-exclusive category. Some contemporary ‘problems’, such as the material consistency of space and the volume of the Earth, would have previously been considered ‘mysteries’, while other ‘problems’, such as the antibiotic properties of Penicillin notatum (the proverbial bread mold that accidentally contaminated one of Alexander Fleming’s bacterial cultures, killed it, and in doing so revolutionized modern medicine), were not. The same can be said of other serendipitous discoveries. Even more bewildering is the possibility that a ‘mystery’ can become a ‘problem’ only to regain its status as a ‘mystery’. The origin of the human species was undoubtedly a ‘mystery’ *cum* ‘problem’ in ancient Christendom, as the *Holy Bible* is explicit on the matter. As the preeminence of Christian doctrine wanes in the Western world and Darwinian accounts of evolution gather more scientific weight, the dawn of humanity is once again cast into doubt. It may even well be a ‘mystery’ under the Darwinian paradigm (cf. Dixon 2008), even despite advances in genetic anthropology, as the history of a species is only as good as the fossil record, which may well be lost to time. If indeed ‘problems’ can become ‘mysteries’, then, again, ‘problems’ and so on *ad infinitum*, then it hardly seems worthwhile to treat one as truly distinct from the other.

The recent history of generative linguistics is replete with such reversals of fortune as well (cf. Chomsky 1995), a fact that could stem at least in part from the conflict between the ‘problem’ of syntax/universal grammar and the ‘mystery’ of the lexicon. Neither of Chomsky’s seminal works – Logical Structure of Linguistic Theory (1955) nor Syntactic Structures (1957) – gives much status to the lexicon, presumably operating on the assumption or hope that language could be fully decoded. As the variability among the world’s languages became an unavoidable obstacle to generative linguistics, the role of the lexicon expanded to include what Chomsky (1995:235) termed “a list of ‘exceptions’”; in other words, the lexicon has become a compendium for

language variation. Chomsky's minimalist paradigm assigns a robust range of morpho-phonological, semantic and syntactic features to lexical items, and variations on Chomsky's theories, notably one by Zwart (1997), assume that phonological information is contained within a distinct postsyntactic lexicon. In his introduction to his seminal (1995) work, Chomsky spelled out the changing nature of the field of theoretical linguistics, the unstable notion of what is contained in the lexicon, and an uncertainty as to the exact nature of the line that divides problem from mystery.

> The field is changing rapidly under the impact of new empirical materials and theoretical ideas. What looks reasonable today is likely to take a different form tomorrow. That process is reflected in the material that follows. Chapters 1 and 2 are written from much the same perspective. The approach is changed in chapter 3, considerably more so in chapter 4. Though the general framework remains, the modifications at each point are substantial. Concepts and principles regarded as fundamental in one chapter are challenged and eliminated in those that follow. These include the basic ideas of the Extended Standard Theory that were adopted in the P&P approaches: D-Structure; S-Structure; government; the Projection Principle and the ɵ-Criterion; other conditions held to apply at D- and S-Structure; the Empty Category Principle; X-bar theory generally; the operation Move α; the split-I hypothesis; and others. All are eliminated or substantially revised in successive chapters, particularly the last.
>
> The end result is a picture of language that differs considerably from even its immediate precursors. Whether these steps are on the right track or not, of course, only time will tell. (Chomsky 1995: p 10)

Thus there is no definitive word as to which aspects of language are specified by UG, and which lie within the purview of the lexicon.

If we cannot strictly determine where 'problems' end and 'mysteries' begin, and if their constituents are apt to change sides, then is it really useful to make such a distinction? It is perhaps easy to judge a rat's cognitive limits in maze navigation because we have constructed the problem and know the definitive solution. The same cannot be said of any research questions that press the limits of human understanding,

particularly the questions that have plagued us throughout history: How did we come to exist? What is the nature of our consciousness? Do we exist apart from our bodies? How do we know language? Will these 'mysteries' ever become 'problems'? If so, will they remain so for the balance of human history? If there is an answer to this question, it may only be known in the instant before the extinction of the human race. To the rest of us, the difference between 'problems' and 'mysteries' is only heuristic, but not strictly relevant. Even seemingly cut-and-dry 'problems', such as the circumference of the coast of Britain (c.f. Mandelbrot 1967, 1983), a mere 'problem' of length, become mysterious in the realm of fractal geometry as discussed earlier. The best we can do is to treat each issue as both 'problem' and 'mystery' and try to find converging solutions through diverse methodologies. I maintain that dualistic views on (second) language acquisition, or any cognitive phenomena, are theoretically tenuous at best for similar reasons.

Chomsky rails against Wittgenstein and his proponents' assertion that knowledge of a language can be equated with the ability to speak a language and argues that an internalized, intentional knowledge of language (i.e. 'I-language') as a "philosopher's pipe dream" (5). He offers several thought experiments in defense of his view that externalized, extensional language (i.e. 'E-language') is no more than a poorly defined artifact and of no scientific interest. One such analogy is the person who was able to ride a bicycle, then lost the ability due to a brain injury, then recovered the ability due to medication or recession of the effects of the injury. Chomsky maintains that knowledge was retained even despite the temporary loss of ability, which would prove that ability and knowledge are conceptually unrelated. I would argue that what Chomsky did not consider, however, was the fact that knowing how to ride a bicycle is entirely contingent upon having successfully ridden the bicycle. No one who has been completely paralyzed from birth can claim to know how to ride a bicycle, and it may be argued that knowing

how is to some extent the residual effect of demonstrated ability. Strictly speaking, the Chomskyan argument would allow for the possibility that a child could develop I-language independently of any demonstrated ability to use the language. The idea appears preposterous and has certainly never been documented.

In Chomsky's estimation, the I-language is constructed through the language faculty, a biological structure that is common to nearly all human beings. While Chomskyan theory does address certain ontological developments, it is not, strictly speaking, a theory of change over time and of spontaneous order through chaos. The order, in Chomsky's view, is always present in the language acquisition device, which sorts out the chaotic input. In other words, language acquisition arises *despite* chaos, not *because* of it. This approach is decidedly linear, and classically deterministic, which is wholly at odds with DST.

If one instantiation of language is open to scientific inquiry, but another must be excluded, then there must be a clear line of demarcation between the two. Such Cartesian dualism was repudiated by neurologist Antonio Demasio (1994) in his work, *Descartes' Error: Emotion, Reason, and the Human Brain*, in which he looked at various cases of brain damage that date as far back as the mid-19th century. Patients such as Elliot and Phineas Gage suffered damage to their prefrontal cortices, which left them able to perform well on intelligence tests, but unable to make sound, everyday decisions. Demasio's observations formed the basis of his 'somatic marker hypothesis', which essentially states that behavior and decision making are mediated by emotional processes. Indeed, without emotional capacities, Demasio argues, rational behavior is severely impaired. This argument is a very cogent rebuttal against the Cartesian separation of emotions from rationality, mind from body; indeed, knowledge from performance. Kaitaro's (2007) critique of Demaiso's work points out that Demasio's hypothesis is far

from innovative, but rather has precedents extending as far back as the French Enlightenment, and more specifically the so-called Montpellierian Vitalists.

Just as Demasio argued against a dualistic view of mind and body, Tomasello (1992), among others, in his paper aptly entitled "The social bases of language acquisition", maintained that the social dimension of language cannot be divorced from any brain/mental instantiations of it. He argues that cultural routines, for example, provide very powerful contextual cues that amplify input in order to overcome what Chomsky termed "poverty of the stimulus".

To the extent that it espouses complexity, chaotic fractal processes, and uncertainty, DST would be far more in line with a vision of fully-embodied mind and socially-mediated (first and second) language acquisition. As such, it would be far more felicitous with Piaget's Sensorimotor/Adaptive Model of Intellectual Development (cf. Piaget 1964) as well as the Vygotskian tradition of social and cultural mediation (cf. Vygotsky 1978) than with any theory in which language is autonomous from the rest of the brain/mind as well as the social dimension, as proposed by Chomsky. Such conceptualizations inhibit the study of change over time, which is an undisputable truth of the human condition that was recognized at least as far back as Heraclitus, who observed that "No man ever steps in the same river twice, for it's not the same river and he's not the same man".

The promise of DST in describing complex change that occurs over time, as is the case in language acquisition, is underscored by Thelan and Smith (2006):

> The major contribution of a dynamic approach to development is the potential to bring theoretical coherence to a field that has been beset by dialectics: Nature versus nurture, learning versus maturation, continuity versus discontinuity, structure versus process, perceptual versus conceptual, symbolic versus presymbolic, and so on. The danger of such either-or thinking is not that good studies have not been done, or cannot be done, but that the point of the enterprise,

> understanding change, can be forgotten. Only the framework and language of dynamics can erase these dualities and shift the focus to *how* the developing system works. (2006: 307)

1.6 MOVING FORWARD: USING DYNAMICS TO MODEL SLA

If, as I have argued thus far, second language acquisition is a situated, dynamical process that is indeed compatible with a DST perspective, then the issue becomes one of how to apply the theory empirically to the phenomenon in order to better understand the nature of change within the system.

Clearly, such an approach would involve a broad view of SLA, indeed one that might cross traditional disciplinary lines in favor of a more holistic view of what Dörnyei (2009) terms the *language*, the *agent* and the *environment*. The study of the constituents of second language learning – namely the individual who undertakes learning, the cognition expended, the language itself and the context or community in which the language is learned – span the fields of (differential/educational) psychology, neurobiology, cognitive science, linguistics, sociolinguistics, cultural anthropology and sociology. Taken individually, each discipline treats a relatively small segment of the overall phenomenon, which makes the study of SLA from only one perspective more reductionist and, therefore, more at odds with the DST perspective. Ideally, a dynamical model of SLA would admit that each constituent has equal status and is intricately interrelated with its remaining co-constituents. The co-constituents should thus be treated as *co-dependent* variables rather than *independent* variables, with time as the only independent variable. In van Gelder and Port's (1995) words:

> Dynamical systems in this strict sense always have variables that are evolving continuously and simultaneously and which at any point in time are mutually determining each other's evolution. (1995: 5)

Indeed, if SLA is to be conceived within a dynamical systems framework, then it must disregard disciplinary boundaries between the individual, cognition, language and community, because any change that originates in one domain will spark changes in all remaining domains. This approach is strongly reflected in Thelan & Smith's (2006) notions of *coupling* and *continuity*.

> The promise of dynamics is realized through the assumptions of coupling and continuity. Coupling means that all components of the developing system are continually linked and mutually interactive in the individual and the environment. Continuity means that processes are seamless in time and cumulative; mental and physical activity are assembled in the moment and always as a function of the system's history.
>
> With this formulation, it makes no sense to ask what part of behavior comes from stages, mental structures, symbol systems, knowledge modules, or genes because these constructs do not exist in timeless, disconnected form. There is no time and no level when the system ceases to be dynamic. (2006: 307)

Following these cues, this dissertation acknowledges the ecology that encompasses community, language, cognition and agent, but pays particular attention to the interface between the agent and cognition (or, more generally speaking, the individual language learner and the language learning process), not because it is a more important concept, but because I believe that it has been particularly mischaracterized in the literature.

1.7 Individual Differences and Language Learning

In the following sections, I explore the importunate narrative that perpetuates the notion that those traits that define us as individuals (e.g. personality, language aptitude, and motivation) are one-dimensional, consistent across situational factors and stable through time; this despite recent developments in the field of differential psychology. Interestingly, this narrative even at times infuses the prose of those same researchers who

are promoting more dynamical, process-oriented approaches to individual variation. Moreover, I discuss how the literature portrays these individual traits as determining language learning outcomes, but not vice-versa. The overarching purpose of this dissertation, of course, is to recast the relationship between the individual and (language) learning as mutual and dynamical, rather than linear and unidirectional. My argument is that learning and using a different language can provide a sufficient contextual shift to trigger the emergence of distinct personal traits, which, in turn, alter the nature of language learning/usage.

The study of individual differences, or IDs, has lately been gaining momentum in educational research. According to Dörnyei (2005), one of the most prominent researchers in the field, the IDs that are among the most relevant to SLA are personality traits (including temperament and mood), motivation, learning/cognitive styles, learning strategies and language aptitude. These by no means constitute all IDs, but merely those that have been heavily researched within the context of SLA.

Dörnyei (2005) frames all IDs as a set of fixed qualities that can be consistently measured against an idealized norm.

> [Individual differences] constructs refer to dimensions of enduring personal characteristics that are assumed to apply to everybody and on which people differ by degree. Or, in other words, they concern **stable** and **systematic** deviations from a normative blueprint. We should note that these descriptions reflect well the basic dilemma for the scientific study of human differences, namely how to conceive of general laws or categories for describing human individuality …" (2005: 4) (emphasis mine)

In a more recent article, Dörnyei (2009) reiterated the concept of IDs as being invariant over time.

> Learner characteristics in applied linguistics have traditionally been investigated within the context of *individual differences* (IDs), which are conceived to be attributes that mark a person as a distinct and unique human being. Of course,

> people differ from each other in respect of a vast number of traits, of which ID research has traditionally focused only on these personal characteristics that are **enduring**, that are assumed **to apply to everybody**, and on which people differ by degree. In other words, ID factors concern **stable** and **systematic deviations** from a normative blueprint (Dörnyei, 2005). (Dörnyei 2009: 231) (emphasis mine)[3]

In this same article, however, he admits that "the seemingly comprehensive and straightforward picture of IDs being stable and monolithic learner traits that concern distinct learner characteristics is part of an idealized narrative that may not hold up against scientific scrutiny" (2009: 232). Clearly, Dörnyei signals a need for more dynamical models of IDs, which reflect his own pioneering work in motivational studies. Indeed, over the past decade, he has developed more process-oriented models of motivation, recognizing that "[e]ven during a single L2 class one can notice that language-learning motivation shows a certain amount of changeability, and in the context of learning a language for several months or years, or over a lifetime, motivation is expected to go through rather diverse phases" (2005: 83). Such progressive research is at odds with an outdated, yet persistent view of IDs.

Part of the problem, according to Larsen-Freeman & Cameron (2008), also acknowledged by Dörnyei (2009), is that it is "easy to fall back into old ways of thinking, and requires continual monitoring to ensure that ways of talking (or writing) reflect complex dynamic ways of thinking" (2008:p. x). As of August, 2011, Google Scholar lists 178,000 books and articles in which the terms 'Individual Differences' and 'dynamic' are collocates out of 1,670,000 total articles that contain the term 'Individual Differences'. Of the 178,000 books and articles, over one-third (67,600) were published within the past year. Thus, the use of the term 'Individual Differences' as a dynamical

[3] Dörnyei is certainly not alone in framing IDs as static. Robins, Fraley, Roberts and Trzesniewski (2001), for example, conducted a longitudinal study of personality change in college-aged students and concluded that, even in the midst of the life-changing events that often go hand-in-hand with the college experience, "personality exhibits surprising levels of continuity" (636).

construct is a relatively recent counter-trend that is in constant conflict with its entrenched connotation.

The other part of the problem is that a static notion of individual differences still persists not only in the theory but also the metrics used in ID research. Participants are typically asked to answer a series of impressionistic, decontextualized and detemporalized questions that supposedly reveal the overall type of person they are. Examples from the most widely used questionnaires are given in Table 1 below.

All of the IDs listed in Table 1, with the exception of language aptitude, use similar psychometrics that rely on self-reporting and are measured for test-retest reliability, or consistency over time. Although none of these questionnaires can claim perfect test-retest correlations (see Lalonde & Gardner 1984, Kolb 1984, Myers & McCaulley 1985), reliability (and also validity) remains a gold-standard of psychometrics. The very idea that personal traits become fossilized is fundamentally at odds with a DST/emergentist perspective.

Dörnyei & Ottó (1998) represent recent innovations in ID research in that they divide motivation into three temporally situated stages: *choice motivation*, *executive motivation*, and *motivational retrospection*. 'Choice motivation' relates to the initial decision to undertake a task, 'executive motivation' allocates sustained effort to see the task through to completion, and 'motivational retrospection' assesses the costs and benefits of efforts expended.

This cycle could be viewed as a repetitive loop that feeds upon itself in such a way that motivational retrospection can have direct consequences on subsequent motivational choices. For example, perceived success in learning a language could possibly increase the future desire to continue learning languages. The output

ID	Widely-used test	Examples of test items
Personality	Meyers Briggs Personality Test (MBTI): 93 word pairs and word phrases	Word phrases: • Do you generally prefer courses that teach concepts and principles, or facts and figures? • Do you more often let your heart rule your head, or your head rule your heart? • Would you rather be considered a practical person, or an ingenious person? • In doing something that many other people do, does it appeal to you more to do it in the accepted way, or invent a way of your own? Word pairs: • analyze/sympathize • systematic/spontaneous • concrete/abstract
Motivation	Atitude/Motivation Test Battery: originally developed by Gardner in 1985, measures aspects of motivation such as *integrative orientation* and *instrumental orientation*.	• Studying French can be important for me because it will allow me to meet and converse with more and varied people. • Studying French can be important for me only because I'll need it for my future career. (cited in Dörnyei 2005: 72).
Learning strategies	Kolb's Learning Styles Inventory (LSI)	When I learn: ___I like to deal with my feelings ___I like to watch and listen ___I like to think about ideas ___I like to be doing things I learn best from: ___Observation ___Personal relationships ___Rational theories ___A chance to try out and practice (cited from Dörnyei 2005: 133)

Table 1: ID Tests

from one cycle thus becomes the input for the subsequent cycles, and as this cycle repeats itself, it constructs an intricate web of motivational tendencies that define an individual. This view of motivation would be felicitous with DST, which sees the world as an ever-changing, fractal set of processes, each giving rise to more complex phenomena.

In preparation for receiving the APA Award for Distinguished Contribution to Psychology, Gardner (2010:10) reflected upon the conundrum of the inability of correlational statistics to determine causality in second/foreign language learning. He looked to a convergence of the research for affirmation of a belief he shared with his colleagues: "We believe that personality causes, or accounts for some behaviours, intelligence plays a role in academic achievement, anxiety disrupts performance, etc.". The problem with this stance is that if behaviors also bear on personality, if academic achievement also enhances intelligence and if disrupted performance also gives rise to anxiety, then causality becomes increasingly elusive. Indeed, if two variables bear upon one another as they would in a repetitive loop, but not in a linear paradigm, then it would be impossible to assign strict causality. Moreover, inferring causality from correlation, Gardner's (1999) principal aim, would be a moot point.

Much work has been done to study such linear schema in reverse, though it is somewhat limited to attitudes and motivation, and often yields models that are equally as linear. The notion that attitudes influence behavior is quite intuitive; however, Olson and Stone (2005), for example, reviewed three theory-driven models that describe how behaviors bear on attitudes. The models are: (1) 'biased scanning' (i.e. behavior induces a selective memory search, which may influence attitudes), (2) 'dissonance theory' (i.e. an actor feels responsible for behavior and realigns attitudes with volitional actions) and (3) 'self-perception theory' (i.e. an individual infers [new] attitudes using their past behaviors as evidence). Interestingly, Olson and Stone also addressed the issue of

stability, pointing out that consistency is not inherent to attitudes, but rather externally imposed through an individual's desire to avoid hypocrisy, for example (265). If it is generally agreed, then, that behavior bears on attitudes and that attitudes bear on behavior, then it is possible to construct a cyclical model the depicts the interrelation of the two variables more accurately.

This dissertation is dedicated to just such a task, attempting to apply the constructs of emergence and DST to motivation, attitudes, personality and even the more cognitive-oriented IDs, such as aptitude[4]. DST would predict that all IDs, not simply motivation and attitudes, wax and wane and are constantly emerging. Stability would be viewed not as inherent to IDs, but rather as an optimized set of 'make-do' solutions wrought over time for a given, apparently-stable context. Why would learners reinvent their personality or learning strategies if the status quo does not threaten their continued successful existence? Why would patients retrain their motor skills before a stroke rendered them immobile? There is a large difference between viewing IDs as fossilized traits versus a set of optimized predispositions that metacognitive resources are constantly fine-tuning until such time as they may become obsolete. This dissertation will take the latter perspective and will attempt to situate ID self-reports within the disruptive process of L2 learning/interaction. Moreover, it will challenge test-retest reliability as a specious construct in SLA-related ID psychometrics to the extent that it measures traits that are bound to change over time.

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[4] The present study focuses on attitudes, motivation, personality and aptitude, not to fully describe the learner/agent, but rather to serve as markers of various points along the learner's metacognitive-cognitive continuum, with motivation representing the metacognitive dimension, aptitude representing the cognitive dimension and personality lying somewhere in between. Also, I chose IDs as opposed to other descriptive frameworks, such as *identity*, because (1) I believe it has IDs have been inaccurately cast in the literature as 'stable' (whereas identity is generally seen as more dynamic [see Weinreich & Saunderson [2003], for example]) and (2) unlike identity, IDs are usually quantitatively measured, thus allowing for more mathematically rigorous research designs (see discussion on Gregg [2010] in Section 2.2).

1.8 SUMMARY

The aim of the current chapter was to (1) present the general principles of DST; (2) discuss how DST diverges epistemologically from mainstream (Chomskyan) generative linguistics; (3) argue that language learning/use can indeed be conceived of as a dynamical system; (4) justify the scope of the present dissertation, which looks primarily at the interface between agent and cognition in SLA, rather than cognition as a disembodied construct; and (5) argue that current research on Individual Differences as they pertain to SLA is presently ill-equipped to inform a dynamical approach. In the following chapter, I discuss interaction as a primary locus of SLA and attempt to devise a means of investigating the interface between interactional language learning/use and Individual Differences, arguing that not only is the interaction shaped by the individual(s) involved, but also that the individual(s) involved must be shaped by the interaction. Chapter 3 covers the methodology of the present investigation, Chapter 4 details the results, and the final chapter is devoted to discussion and conclusions.

Chapter 2: Framework

2.1 INTERACTION IN SLA

The present study looks at language learning and use within an interactional framework, departing from the Chomskyan duality of competence versus performance (as discussed in Chapter 1) and adhering to the principle that interaction is not only at the core of the human experience (Levinson 2006), but also a fundamental locus of second language acquisition (Tomasello 1992; Mackey 2007; Long 1996; Vygotsky 1978, 1986; Lantolf & Thorne 2006; Larsen-Freeman 2006).

2.1.1 The 'core interaction engine'

Levinson (2006) posits the existence of a human 'core interaction engine'; that is, the innate cognitive abilities and behavioral dispositions that motivate face-to-face interactions. These interactions involve more than just speech streams; they are multi-modal and they have universal properties. He argues that this concept has *prima facie* evidence, citing research that indicates, for example, that infants exhibit a nascent understanding of interactional norms prelinguistically. Levinson goes on to account for the implications of the interaction machine: it requires a theory of mind, understanding of common ground, Gricean intentions and cooperation, including observable turn taking and sequence templates.

Schegloff (2006) makes a similar proposition in arguing that interaction is the root of human sociality, and forms the basis for institutions such as law, religion and economic order. He sketches out what he believes to be five 'generic' problems in interaction along with their respective solutions. These include 'turn taking' (i.e., the

need to allow for initiative and response), 'sequence-organization' (i.e., the need to shift topics in a coherent manner), 'interaction repair' (i.e., understanding unexpected talk or conduct so that interaction does not break down), 'word selection' (i.e., constructing actions through talk rather than simply attending to correctness of the utterance), and the overall structure for interactions (which are signaled by greetings and goodbyes, for example)[5].

The solutions to these problems are considered 'generic' because they permeate all human interaction. Schegloff notes that if other species exhibit organized interaction, there is no reason to suppose that humans do not. Thus, it is understandable that explorers can communicate with indigenous tribes even in the absence of a *lingua franca*. Schegloff argues that interaction is designed to be so accessible, in fact, that it does not necessarily require intersubjectivity or common ground (and thus no theory of mind is necessary).

Although Shegloff and Levinson apparently disagree over the need for a theory of mind as a prerequisite for interaction, both make a very convincing argument that language learning and use is fundamentally interactionally-motivated. This argument is generally supported by theories of language variation (e.g. R. Ellis 1985, 1999; Tarone 1988), emergentism (e.g. Ellis 1998; Hopper 1998; MacWhinney 1999, 2001) and connectionism (e.g. Ellis 1998), among others. As Tomasello (1992) points out:

> Language is social behavior. Its structures are social conventions. Its functions all derive in one way or another from communication. It can be acquired only through social interaction with other human beings. It requires for its acquisition specific skills of social learning. As Wittgenstein (1953) pointed out nearly four decades ago, the idea of a private language makes absolutely no sense at all. (1992: 67)

[5] Schegloff (2007) calls these five principles the 'generic orders of organization', adding 'action formation' to the list (xiv).

Lave and Wenger (1991), in particular, detailed how interaction was critical, and not merely incidental, to learning. They presented various case studies, involving such disparate 'communities of practice' as Yucatec midwives and non-drinking alcoholics in Alcoholics Anonymous, to illustrate how learning could take place even without explicit pedagogical intervention.

Learning, in Lave and Wenger's estimation, is not merely a mental exercise, but a process of social engagement – a notion echoed by McDermott (as cited in Murphy 1999):

> Learning traditionally gets measured as on the assumption that it is a possession of individuals that can be found inside their heads… [Here] learning is in the relationships between people. Learning is in the conditions that bring people together and organize a point of contact that allows for particular pieces of information to take on a relevance; without the points of contact, without the system of relevancies, there is not learning, and there is little memory. Learning does not belong to individual persons, but to the various conversations of which they are a part. (17)

Newcomers to a field begin as peripheral participants. They look to the old-timers for knowledge and values. As time progresses, they gain status as full participants, and eventually become the old-timers that then look to the new-comers as a means of perpetuating their institution. In the case of the non-drinking alcoholics, for example, the community of practice is Alcoholics Anonymous (which coined the term 'non-drinking alcoholic'). The newcomers must subscribe to the conventions of the community and be accepted as legitimate peripheral participants. In time, they gain full status by following the course set by the community. In the case of Alcoholics Anonymous, this is the famous '12 step' program. In all cases, the participants learned not through abstract pedagogy, but through highly contextualized or 'situated' social interactions.

In Lave and Wenger's schema, there is no such thing as '*un*-situated' learning. Even the university foreign-language classroom involves a community of practice; that is, the foreign language department of the particular university and, more generally, the professional organizations and refereed journals that bind language departments and instructors alike. The old-timers are the linguistics and literature professors, who uphold conventions and values that they pass on to their students. The student is the legitimate peripheral participant who subscribes to the syllabus and the course of study. With time, some advance to become full participants, thereby gaining even more access to the professors and, in so doing, take on more and more characteristics of their mentors, learning particular discourse patterns and adopting similar values and conventions. An unfortunate consequence of university language instruction is that its community of practice may bear very little resemblance to its respective target-language communities. Regardless, learning is always a social endeavor that is predicated on learning to talk (or interact) in certain ways.

> For newcomers, the purpose is not to learn *from* talk as a substitute for legitimate peripheral participation; it is to learn *to* talk as a key to legitimate peripheral participation. (Lave & Wenger 1991: 108-109)

Lave and Wenger's notions of learning involving repetitive, highly-contextualized processes are entirely felicitous with DST, much more so than any purely cognitive approach.

2.1.2 Interactions in SLA.

Within the domain of SLA, three major paradigms treat interactional language learning: (1) the structuralist paradigm (Egi 2007; Ellis 2007; Gass 1997; Gass & Mackey 2006; Long 1996; Mackey 2007; Sato & Lyster 2007; Schmidt 1990, 1995, 2001;

Trafimovich et al. 2007), also known as the 'cognitivistic' (Firth & Wagner 2007) or 'interactionist' approach (Adams 2007), (2) the sociocultural paradigm (Aljaafreh & Lantolf 1994; Lantolf & Thorne 2006; Ohta 2001; Swain 2000; Vygotsky 1978, 1986; Wertsch 1991, 1998), and (3) the socio-psycholinguistic paradigm (Ellis & Larsen-Freeman 2006; Koike 2010).

The structuralist paradigm springs largely from the work of Ferdinand de Saussure, who revolutionized the study of linguistics by portraying language as a system of arbitrary linguistic signs and their corresponding referents. This view of language as elemental, or a collection of discrete units, permeates much of the research in applied linguistics even now. This theory of language, which Ellis & Larsen-Freeman (2006) dub a 'property theory', is distinguished from theories of learning, or 'transition theories' in the structuralist SLA paradigm, a dualism that is perpetuated by the legacy of Stephen Krashen's work.

Krashen's research into the (linear) relationship between comprehensible input and the interlanguage has had a profound impact on modern structuralist SLA research, which commonly views SLA as the incorporation of discrete forms into a learner's linguistic inventory. Indeed, Krashen (1981) argued that second language acquisition follows a 'natural order', which dictates the sequence in which new forms can be acquired. As each new structure is acquired in due course, then *i+1* or comprehensible input that contains the next structure to be acquired will advance the learner down the predetermined path to language acquisition.

In a similar vein, Gass (1997) outlined the structuralist SLA learning schematic, which involves running linguistic elements through a linear process: input → apperceived input → comprehended input → intake → integration → output. This schematic is the culmination of not only Krashen's work, but also that of Schmidt (1990, 1995, 2001),

with regard to noticing, that of Swain (1985, 1995), with respect to output, and many others. At its core however, language learning is ultimately dependent on comprehensible input, and research in the structuralist vein has focused on those aspects of interaction that make input more accessible (or comprehensible) to the learner (Swain 2000). Long's (1996) interaction hypothesis, which has also become foundational to studies of interaction within the structuralist paradigm, states that this learning process is enhanced by negotiation for meaning and focus on form that occurs in the course of a meaningful conversation involving a language learner, particularly because it "connects input, internal learner capacities, particularly selective attention, and output in productive ways" (451-452).

Mackey (2007) reviewed over 75 published studies that have been heavily influenced by Long's work, thereby reaffirming Gass and Mackey's (2007) claim that the Interaction Hypothesis is advancing to theory status. Mackey (2007) also presented 16 new empirical studies, which, in her estimation, represent the current trends in the field.

As would be expected, the studies presented in Mackey (2007) focused on linguistic structures, mostly lexical and syntactic. Some, such as Ellis (2007), looked at particular structures (i.e. past tense and comparison morphology), while others such as Egi (2007) looked at a broader variety of morphosyntactic and lexical 'errors'. Moreover, the studies generally tested variables that would hypothetically impact one or more of the elements of Gass' (1997) learning schematic outlined above. Trofimovich et al. (2007), for example, asked their participants to indicate whether or not they had noticed a computer-delivered recast, while Sato and Lyster (2007) looked at the effects for feedback type and interlocutors on modified output.

Sato and Lyster (2007) contrasted learner-NSs and learner-learner dyads not only in terms of modified output, but also in more qualitative terms. They found that learners

supplied more modified output with non-NSs than with NS interlocutors regardless of feedback type. The learners reported that this pattern was because NSs were better able to guess their meaning despite their errors and that they did not want to interrupt the conversational flow, but rather focus on their listening skills. Such differences may not have been as obvious in a more naturalistic setting. This study runs into trouble, however, when it claims that interaction between learners might be more beneficial to language learning than NS-learner interactions. This claim effectively reduces learning to a single act (i.e. output modification), which is a tenuous position to say the least.

Ellis (2007) reported that he found no clear effect for recasts and only a variable effect for explicit feedback on the target structures as measured by his post-tests. This finding could be interpreted as counterevidence to Mackey's assertion made in her introduction that recasts are particularly useful in SLA. Of course, because this study was limited to two structures, Ellis conceded that other structures may react differently and avoided rejecting his hypothesis altogether. Taken together, this body of research within the structuralist paradigm, while theoretically incompatible with DST on the basis of its linear and classically-deterministic underpinnings, highlights the important role of feedback in interactional learning.

The sociocultural paradigm springs largely from the work of Vygotsky (1978, 1986) as well as others (e.g. Wertsch 1991, 1998). It stands in stark contrast to the structuralist paradigm primarily in that the focus is not exclusively on the effect of external stimuli on a learner's cognitive development, but primarily on the social artifacts, activities and concepts that make learning both relevant and possible (Lantolf & Thorne 2006). According to Vygotsky (1978: 57),

> Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people

> (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals.

For Vygotsky (1978), learning (in the cognitive sense) is a process of internalization that takes place within one's Zone of Proximal Development (or ZPD); that is, the distance between how far a learner can advance with the collaboration of those who are more capable and how far the learner can advance alone. The ZPD itself is situated in and mediated "through participation in cultural, linguistic, and historically formed settings such as family life and peer group interaction, and in institutional contexts like schooling, organized sports activities, and work places, to name only a few" (Lantolf & Thorne 2007: 197). It is a construct that is negotiated and renegotiated between expert and novice as the novice is able to perform with decreasing levels of mediation.

Swain (2000: 103) admitted that her research into the role of output in SLA had led her to realize that output should not be examined merely as an opportunity for language learners to consolidate their knowledge of a language, nor merely as an opportunity to notice their own interlanguage gaps, but also as part of a "collaborative dialog" in which linguistic knowledge is co-created. She therefore renounced the term 'output' and its associations with the (structuralist) 'conduit metaphor' in favor of a more socially-mediated concept of language production, in which output is not only spoken, but also heard by other(s) as an opportunity for response and collaboration. Swain thus situated herself firmly in the sociocultural camp and illustrated how analyzing dialog could reveal various stages of cognitive development as well as the 'stretching' of the interlanguage.

> [C]ollaborative dialogue is problem-solving and, hence, knowledge-building dialog. When a collaborative effort is being made by participants in an activity, their speaking (or writing) mediates this effort. As each participant speaks, their 'saying' becomes 'what they said', providing an object for reflection. Their 'saying' is cognitive activity, and 'what is said' is an outcome of that activity. Through saying and reflecting on what was said, new knowledge is constructed. (Not all dialogue is knowledge-building dialogue.) In this way, our students' performance outstripped their competence. (113)

Aljaafreh and Lantolf (1994) studied the interactions of three ESL learners with their tutors to show that language learning could be characterized as a transition from other- to self-regulation. Each week, the tutees and tutors would meet to read over essays written by the tutees. When either noticed an error, they would stop and discuss it. At the beginning, the tutor would start out vaguely asking if the tutee noticed anything wrong, gradually giving more explicit feedback until the tutee was able to correct the error. As time went on, Aljaafreh and Lantolf noticed that the tutees were increasingly able to identify and correct errors on their own. Thus learning was not strictly measured by performance, but rather by the decreasing amount of mediation needed to attain a particular linguistic goal.

According to Vygotsky (1986), private speech, or dialog with one's self, is an important transitional stage between social interaction and mental processes. Wertsch (1985) illustrated that children working a wooden puzzle would first use their parents' support, and then appropriate their verbal instructions in private speech in order to achieve greater independence. Thus, the children used speech that originated in the social domain in order to self-regulate their actions. Similarly, Ohta (2001:14) recorded and transcribed some 34 hours of private speech in a Japanese foreign language classroom setting, which she used to make several points, two of which were that private speech was a common feature of L2 classrooms and could be viewed as a window to mental processes underlying SLA.

The social-psycholinguistic paradigm takes an even broader approach, generally drawing from both structuralism and socioculturalism in an effort to achieve paradigm harmony. One important difference, however, is that in the social-psycholinguistic paradigm, learning is above all a dynamic process where grammar is not transmitted in discrete units, but rather emerges over time. Ellis and Larsen-Freeman (2006) assert that language learning is exemplar-based and, like Hall et al. (2006), see grammar as dependent on our previous memories and experiences with particular utterances. As our experiences in the world fluctuate, so too does our grammar.

Unlike Gass' (1997) learning schematic, the social-psycholinguistic paradigm sees learning as a non-linear process that conflates 'property theory' and 'transition theory'. "Learning is ever thus. It takes place in a social context, involving action, reaction, collaborative interaction, intersubjectivity, and mutually assisted performance" (Ellis and Larsen-Freeman 2006: 572). NS interlocutors use a variety of means to make their speech more comprehensible (e.g. orienting to the here and now) while learners are agents in directing their attention and initiating negotiation sequences. Learning is thus a collaborative process.

Adams (2006) looked at task-based instruction as a pedagogical application that appeals to both interactionists (=structuralists) and socioculturalists. Within the interactionist framework, task-based instruction has been found to promote noticing, negotiation for meaning, feedback (both explicit and implicit) and focus on form while engaged in meaningful interaction. Within the sociocultural paradigm, Adams claimed that task-based instruction is seen as an opportunity for learners to engage socially in the co-construction of meaning. Despite her concession to socioculturalism, Adams subsequently engages in a structuralist exercise by targeting particular units of grammar

(locatives and past tense), and reducing interaction to 'language-related episodes' and focus on form. This approach results in an etic interpretation of a phenomenon that supposedly enhances elements in a linear chain of language learning (cf. Gass 1997).

Koike (2010) looked to learner/NS expectations as both the input and the result of a learning situation. This is an emic construct, which appeals to the socioculturalists; it is iterative and process-oriented, which appeals to cognitive scientists, and intertwined with noticing, which appeals to structuralists. Koike relies on previous research on frames (Minsky 1974) and scripts (Schank & Abelson 1977) to illustrate that our expectations are experientially and culturally mediated. Frames are essentially stereotyped situations, while scripts are stereotyped episodes. When we encounter new situations, we apply and make necessary adjustments to these expectations. In a similar fashion, our expectations within a given context can sensitize us to contextualization cues (Gumperz 1995) or 'metapragmatic signals', such as metaphorical codeswitching, that can have communicative value apart from the Saussurian referential meaning of a particular utterance.

This work does represent a functional and cultural approach to SLA in that it incorporates models of social discourse and cognition that could be considered a 'mid-point' between the sociocultural and structuralist paradigms. However, epistemologically speaking, it ultimately does stay firmly in the sociocultural camp in that (1) it assumes an emic perspective, (2) it does not conceptualize acquisition (or expectation modification) as a static end-product in a chainlike learning schematic, and (3) it does not quantify expectations (as structuralism is apt to do with grammar knowledge), but sees it as a dialogic, fluid and emergent construct.

2.2 A DYNAMICAL APPROACH TO SLA RESEARCH

At present the DST paradigm has produced relatively little empirical research in the field of SLA (and none within an interactional framework) as it has only recently come to the fore. Larsen-Freeman (1997) was among the first to argue that language use/learning could be conceived within such a framework, noting that she saw "many striking similarities between the science of chaos/complexity and language and SLA" (141), but it was not until the following decade that a research agenda began to take form and gain momentum (DeBot, Lowie & Vespoor 2005; Ellis & Larsen-Freeman 2006; Van Lier 2004).

Ellis and Larsen-Freeman (2006) argue against the distinction made between theories of language (property theories) and theories of language acquisition (transition theories). They view language as a set of properties that are continuously emerging from a dynamical system, a stance that precludes the possibility of extracting structures from their environment. They conducted a meta-analysis of recent SLA literature to offer specific evidence in support of their 12 maxims (which they actually termed 'morals'), which serve as a guide to SLA research in a dynamical framework. The maxims that are most relevant to this dissertation are discussed below:[6]

MAXIM 1: No 'magic bullet' to acquisition. A meta-analysis of morpheme order studies revealed that no one factor could account for a significant amount of variance in widely-attested sequences of acquisition.

MAXIM 2: 'Multivariate causes' and non-linearity. Research on L3 acquisition reveals that even lexical transfer can occur in complex ways and can involve the L2 to a

[6] The remaining maxims are: (3) Competence is variable; (6) Regularities are emergent; (7) That which makes an L1 easy makes an L2 difficult; (11) Language is a complex adaptive system; (12) An emergentist account of language behavior must account for the origins of such behavior.

greater extent than the L1. This makes the issue of finding determinants of transfer or interference nearly impossible.

MAXIM 4: Time is of the essence. Dörnyei's work on motivation stages illustrate that it is constantly in flux and cannot be operationalized as static.

MAXIM 5: Group generalizations often fail at the individual level. This maxim is more clearly developed in Larsen-Freeman (2006) (reviewed below).

MAXIM 8: Learning is a conscious process. Ellis and Larsen-Freeman reject Krashen's notion that there is implicit and explicit knowledge that occupy different spaces within our brain, and that there is some degree of interface between these two types of knowledge. They propose instead that learning is an interconnected process. Indeed, the mechanisms of interface between explicit and implicit knowledge posited by SLA "noticing, selective attending, noticing the gap, skill-building, coaching, processing" (569) are all atelic processes. They characterize relationship between implicit and explicit knowledge in the following way: "Consciousness is the interface, and like consciousness, the interface is dynamic: it happens transiently during conscious processing, but the influence upon implicit cognition endures thereafter (Ellis 2005)". (570) Thus for Ellis and Larsen-Freeman, learning is a continuous interplay between implicit chunking and tallying, and explicit instruction and interactionally-motivated focus on form. All of these involve conscious effort; therefore, consciousness is the interface.

MAXIM 9: Emergent consciousness is the 'stuff of learning' and is context-dependent. Ellis and Larsen-Freeman look to brain imaging studies of the neural correlates of consciousness to point out that consciousness is directed to the stimulus with the greatest clout. They note that "Consciousness is the publicity organ of the brain. It is

a facility for accessing, disseminating, and exchanging information, and for exercising global coordination and control. This is the interface, the 'stuff' of learning" (571).

MAXIM 10: Cognition is socioculturally situated. "Learning is ever thus. It takes place in a social context, involving action, reaction, collaborative interaction, intersubjectivity, and mutually assisted performance" (572). NS interlocutors use a variety of means of making their speech more comprehensible (e.g. orienting to the here and now) while learners are agents in directing their attention and initiating negotiation sequences etc. Learning is thus a collaborative process.

Taken together, Ellis and Larsen-Freeman's meta-analysis and conclusions point to language as an emergent phenomenon that is indistinguishable from the ecological system in which it is evidenced. It is a 'complex adaptive system' that operates across various levels, human populations and timescales, according to Ellis and Larsen-Freeman.

In an extensive critique on Larsen-Freeman (and Cameron's) work on DST, Gregg (2010) points out that there are essentially no empirical studies explicitly linking DST to SLA, nor are there any meta-analyses of existing SLA literature as it applies to complexity theory along the lines of Thelan and Smith's (1996) work on DST and child development (554). The overall usefulness of Larsen-Freemen and Cameron's work to DST-based research is dubious, according to Gregg, due to (1) their rejection of mathematical rigor (which is an integral component of DST in other disciplines), solely on the basis that there are too many intervening variables; (2) they give no mechanisms with which to discern noisy from relevant data (again a feature of DST in other disciplines); (3) they do not make clear how studying a dynamical system's component forces is any different from reductionism, which they so vehemently reject. These valid

criticisms certainly would explain that most work on DST to date has been conceptual rather than empirical. Still, a few such studies do exist.

Larsen-Freeman (2006) analyzed written and oral narratives of five Chinese learners of English gathered over a 6-month period. She revealed that, although the group on average made steady improvements in terms of fluency, accuracy and complexity, the disaggregated results revealed divergent individual trajectories. Larsen-Freeman argued that such variation was not simply a matter of measurement error, as is often assumed in quantitative SLA studies, but rather an indication of the different paths to language acquisition. Some learners, for example, made gains in fluency, while others showed progress in complexity. The presumption is that such variability is volitionally and contextually mediated, and not merely 'noise' that needs to be 'normalized'. Larsen-Freeman did conduct both quantitative and qualitative analyses on her data, although her quantitative data did not reveal any statistical significance.

Spoelman and Vespoor (2010) traced the complexity and accuracy and 54 writing samples from a single Dutch learner of Finnish over a period of three years. They found that word complexity and sentence complexity, as well as word complexity and NP complexity, developed in tandem and were considered 'connected growers'. On the other hand, NP complexity and sentence complexity developed alternately and were considered competitors. Again, Speolman, and Vespoor underscore the volitional aspect of attentional resource allocation in SLA (an idea closely linked to IDs in general and motivation in particular). Moreover, Spoelman, and Vespoor used typical regression analyses coupled with the Monte Carlo method to identify those correlations that were coincidental, and their conclusions were supported by statistically significant results.

Lyle (in press) revealed fractal tendencies in French Tense/Aspect production/competence that were better explained within the DST framework than as

linear sequences, as depicted by the Lexical Aspect Hypothesis (cf. Andersen 1991; Andersen and Shirai 1996) and the Discourse Hypothesis (cf. Bardovi-Harlig 1994), or cyclical sequences (Labeau 2004). More specifically, he loosely replicated Salaberry (2008), which involved a narrative passage with multiple-choice verbal conjugations (i.e. the simple past and imperfect) to determine how learners at various levels of proficiency marked tense and aspect in different semantic/discursive environments. Lyle included a think-aloud protocol and discovered that if he added a conjugation (i.e. the present tense) to the multiple-choice list, new patterns of usage emerged accompanied by think-aloud comments, indicating that participants were systematically reformulating their interlanguage in a make-do response to the new set of stimuli in ways not predicted by either the Lexical Aspect or the Discourse Hypotheses. He therefore proposed a model of French tense/aspect acquisition that involved variable, contextually-mediated competence. Again, Lyle used pairwise comparisons to demonstrate the statistical significance of his data.

Thus, although most DST studies in SLA are exploratory, it appears as though methodologies that involve quantitative, multivariate modeling are beginning to take shape. Studies, such as those reviewed above, answer Gregg's (2010) first two challenges (though, clearly, there is still much work to be done). The third challenge of tracking large numbers of variables simultaneously – indeed, variables that are normally treated by different disciplines – in order to avoid unnecessary reductionism is a challenge taken up by the present dissertation. It should also be noted that the empirical studies reviewed above, strictly speaking, do not view language within an interactional framework, which is especially surprising in Larsen-Freeman's (2006) case, given that her and Ellis' (2006) Maxim 10 (discussed above) underscored the importance of the

sociocultural dimension in learning. Again, this dissertation responds to the challenge of studying language in an interactional situation.

To summarize the discussion thus far, the present study attempts to adhere to the following principles:

1. Interaction is the core of (language) learning (Lave & Wenger 1991; Levinson 2006; Long 1996; Murphy 1999; Schegloff 2006; Tomasello 1992).
2. SLA is the result of 'multivariate causes' and non-linear processes (Ellis & Larsen-Freeman 2006).
3. SLA, in that it is a dynamical process (Larsen-Freeman & Cameron 2008; Barranger n.d.), is ideally studied longitudinally, at both the individual and group levels (Ellis & Larsen-Freeman 2006; Larsen-Freeman 2006).
4. (Language) learning is a conscious process and consciousness is the learning interface (Ellis & Larsen-Freeman 2006; Dörnyei 2009).
5. (Language) learning is a socioculturally-situated collaborative process (Ellis & Larsen-Freeman 2006; Lave & Wenger 1991).
6. DST studies in SLA should employ quantitative modeling to the greatest extent possible (based on critique by Gregg 2010).
7. DST studies in SLA should embrace as many variables as possible (based on critique by Gregg 2010).

2.3 'MEASURING' INTERACTIVE LANGUAGE LEARNING/USE

In order to measure interactive language learning/use in such a way that it captures the role of consciousness as well the social dimension (see principles in section 2.2), the present study uses a variety of markers taken from various linguistic paradigms

(see Chapter 3 for a more detailed methodological discussion). For heuristic and organizational purposes, I divide these markers into three categories: language related episodes, conversation management/pragmatic markers, and metacognitive markers. These categories are intended as nothing more than alternating vantage points from which to observe the same dynamical, interactive learning phenomena and, as such, are fluid, overlapping and mutually dependent, in keeping with a DST perspective.

2.3.1 Language-related episodes.

According to Mackey (2007), interactional feedback includes recasts, clarification requests, confirmation checks, and explicit meta-linguistic explanations (collectively referred to as language related episodes, or LREs), usually centering on lexical and, to a lesser extent, morphosyntactic structures (see also Blake & Zyzik 2003: 526). Of all the LREs, Mackey (2007:15) singles out recasts as a "particularly fertile" area of interactionist research. Indeed, of the 75 studies she reviewed, 51 examined recasts, either exclusively or in conjunction with other LREs. In reviewing the extensive literature on recasts, three issues arise that are relevant to understanding all LREs: (1) clearly defining the type of feedback, (2) understanding the various ways that the feedback is delivered, and (3) discerning what effect the delivery has on the learner. In the remainder of this section, I review these concepts with respect to recasts, but with the understanding that all LREs are equally as complex.

2.3.1.1 Recasts defined.

Mackey (2007) defines recasts as "more targetlike versions of learners' incorrect utterances, which do not change their meanings" (15). They normally are dependent on

and occur directly after the incorrect utterance. Mackey (followed by Sato & Lyster 2007: 129) classified recasts as an inherently implicit form of feedback (14). The implicitness of recasts, according to Mackey, relieves the pressure to respond, which can provide target input without disrupting the conversation.

> Recasts allow interlocutors to provide more targetlike language without disrupting the flow of communication and often without making demands on the learner. In this way, some argue, recasts may facilitate the process of making connections between forms and meanings. (18)

However, as will be discussed in section 2.3.1.3, implicit feedback can go unnoticed or may be misinterpreted by the learner, which poses the challenge of making recasts explicit enough to be apperceived, and yet implicit enough to not disrupt a conversation. Gass and Lewis (2007) made recasts more explicit, for example, by giving intonational cues (i.e. questioning) and using segmented recasts (i.e. repeating or questioning the only the erroneous part of the utterance) (84-85). The optimal level of explicitness in feedback was the topic of Ellis' (Mackey 2007) study. Ellis looked at the effect of different types of feedback (implicit vs. explicit) on different grammatical structures (past tense vs. comparative) and different types of knowledge (implicit vs. explicit). His study included 34 recent immigrants to New Zealand studying in a private language school. He assigned these participants various tasks while another researcher recorded the types of feedback (recast vs. metalinguistic feedback) administered by the researcher/teacher. After instruction, participants were given an imitation test to measure implicit knowledge and a grammaticality judgment test to measure explicit knowledge.

Although he classified recasts as implicit feedback, Ellis acknowledged that certain types of recasts are more explicit than others:

> The recasts were typically declarative and of the partial type and as such might be considered to lie at the explicit end of the implicit – explicit continuum for recasts

(see Sheen 2006). However, they intruded minimally into the flow of the discourse. For example:

Student …they saw and they follow follow follow him

Researcher Followed

Student Followed him and attacked him.

Student Women are kind than men.

Researcher Kinder.

Student Kinder than women. (348)

Ellis found no clear effect for recasts and a variable effect for explicit feedback. It would thus appear that even relatively explicit recasts were not explicit enough to achieve significant results on the post-tests. Mackey (2007: 18) points out, however, that evidence of learning from implicit recasts is often delayed.

2.3.1.2 How recasts are delivered.

One recurrent point demonstrated by the literature is that the manner in which a recast is delivered, as well as the relative status of the person delivering the recast, can affect learning outcomes. Adams (2007) pointed out that although NSs supply more recasts, they are also evident in NNS-NNS interactions. Although Adams did not look exclusively at recasts, she concluded that learner feedback (including recasts) may promote language learning.

Sato and Lyster (2007) looked more closely at the differences between learner-learner and learner-NS interactions, and found that although learner-NS dyads produced

more recasts than learner-learner dyads, learner-learner dyads provided more modified output, regardless of feedback type.

Sagarra (2007) and Sachs and Suh (2007), look at recasts within computer-mediated communication (CMC) and computer-assisted language learning (CALL) contexts. One advantage of computer-mediated recasts is that they allow for consistent enhancement of feedback. While recast enhancement is certainly possible (and probably common) in spoken interaction, through intonation or other gestural/oral cues (see Gass & Lewis 2007, for example), it is often difficult to operationalize and measure. In contrast, text-based interaction allows for very clear enhancement through boldface type, all caps, etc. Moreover, it permits researchers to conduct think-aloud protocols that can illuminate learner awareness of enhanced input.

Sachs and Suh (2007) examined the effects of textually enhanced synchronous computer-mediated recasts on both attention to form and accurate production on post-tests. Thirty Korean EFL learners were first divided into two groups: one received enhanced feedback, while the other received unenhanced feedback. Each of those groups was further subdivided into two groups: one participated in a think-aloud protocol, while the other did not. The feedback centered on backshifting verbs to the past perfect in certain types of reported speech (e.g. they said that they had finished two weeks ago). For those who did participate in the think-aloud protocol, their responses were coded in terms of whether they had noticed, understood, or understood and learned (i.e. they could verbalize the morphological rules relating to) the target form.

Sachs and Suh did not find any significant effects for textual enhancement on accuracy, though all groups' accuracy improved over time. However, the groups that received enhanced input were more likely to report higher levels of awareness (i.e. understanding or understanding and learning), and the latter was significantly correlated

with higher performance on the post-tests. Thus, although there is no direct evidence that enhanced recasts lead to acquisition of this particular structure, there is some indirect evidence.

2.3.1.3 Effect on learners.

Trofimovich, Ammar and Gatbonton (Mackey 2007) used a computer to deliver prompts designed to elicit certain target forms. Regardless of the participants' responses to the prompts, the computer delivered the same pre-recorded feedback (e.g. Question: 'What is he washing?' [pause for response] Recast: 'Yeah, he is washing his face'). Trafimovich et al. claimed that the participant would interpret the feedback as a recast if it followed an erroneous utterance. Otherwise, the learner would consider it a repetition.

This result underscores a methodological issue underlying research on recasts; that is, recasts may be interpreted differentially by the researcher, (other) 'NSs', and language learners/interlocutors. In Trofimovich et. al (2007) as well as Gass and Lewis (2007), the learner determined what was or was not a recast. Other studies did not take learner perceptions into account. The following example from Sachs and Suh (2007) highlighted potential researcher biases in determining what constitutes recasts.

P21: Pete revealed that ex-boss fired Lisa…

R: Oh, he told Gary that their ex-boss had fired Lisa…

P21: Coz of her unhonest (205)

The above exchange illustrates Mackey's observation (following Lyster 1998) that implicit recasts may be seen by the learner as a response to the content rather than

the form of the utterance. It perhaps explains Trofimovich et. al's (2007) observation that learners are significantly more likely to detect lexical rather than grammatical mismatches following recasts (185).

To summarize the discussion on LREs, the large body of structuralist research, if nothing else, points to the fact that LREs are a common (though perhaps infrequent) feature of NS-NNS interactions. Moreover, there is additional evidence that such episodes can direct a learner's attentional resources to the non-targetlike form, which is generally agreed to be a precursor to learning (cf. Long 1996). Sill, research in this area should acknowledge variations in terminology in addition to paying particular attention to delivery (e.g. a NS's preference for explicit vs. implicit feedback or LRE frequency), as well as learner perceptions (e.g. through think-aloud protocols).

2.3.2 Conversation management and pragmatic markers.

In looking at pragmatic and conversation management markers, I turn primarily to analytical frameworks that focus on the functional aspects of language; specifically Speech Act Theory (see Smith 1990; Brown & Levinson 1978, 1987), Conversation Analysis (Haakana 2001, Sidnell 2010; Sacks, Schegloff & Jefferson 1974; Schegloff 2007; Schegloff, Jefferson & Sacks 1977), and Discourse Analysis (Gee 2005; Potter & Wetherell 1987; Potter et al. 1990). The reasons for taking a functional approach are that (1) it is compatible with dynamical views of language as a 'make-do' process that evolves with time, (2) it is fully-contextualized and socioculturally defined (see Ellis & Larsen-Freeman [2006] maxim 10 discussed above), (3) it is indicative of conscious processes in that it views speakers as agents (see Ellis & Larsen-Freeman [2006] maxim 8 discussed above), and (4) functional L2 competence is generally seen as a goal of the

language learning process itself (cf. ACTFL Oral Proficiency Guidelines, for example). It should be noted that there is some debate over the status of Conversation Analysis and Discourse Analysis as paradigms versus methodologies, as well as their compatibility with one another (see Potter & Wetherell 1987; Potter et al. 1990). Such a debate is beyond the scope of this dissertation and should not bear significantly on the results of the present study. Rather than pit these approaches against one another, I draw from what I view to be the relative strengths of each: Conversation Analysis for its understanding of conversational management tasks, such as repair sequences, often featured in interactive language learning, Discourse Analysis for its understanding of the constructive nature of language use, and Speech Act Theory for its understanding of some of the motives behind particular segments of talk (e.g. politeness [cf. Brown and Levinson 1978, 1987]). The remainder of this section will offer more detail on each of these strengths.

Gee (2005) offers an approach to Discourse Analysis in which language works in concert with and often represents social activity and group affiliation. Language for Gee is recruited or "soft-assembled" onsite, always taking a perspective, always taking a stance, and usually constructed in terms of an interlocutor. Information flows are thus manipulated to make certain constructs more salient to the interlocutor. This can be accomplished through syntactic means (e.g. dislocation and cleft constructions), foregrounding/backgrounding, intonation, gestures, or even the use of textual enhancements in non-face-to-face interactions.

It is through the course of discourse that meaning is created. Thus, according to Gee, words may have a 'core' identity, but their full meaning (or 'situated identity') cannot be realized until it is used in context. For example, the Oxford English dictionary defines bachelor as "an unmarried man (of marriageable age)". Yet, Charles Fillmore

(1982) asks questions like: Is the pope a bachelor? Is a thrice-divorced man a bachelor? Is a young man who has been in an irreversible coma a bachelor? Clearly, framing the pope as an unmarried man, and framing him as a bachelor have different implications even though truth-value semantics would not distinguish between the two propositions. Moreover, even the same words uttered by the same person in two situations (e.g. at work versus at home) can take on entirely different meanings.

Just as context validates (and is determined by) certain word choices, or syntactic structures, it can also influence discursive patterns (i.e. which topics we discuss, and how we approach those topics). Gee defines discourse 'models' as patterns extracted from experiences that we use to formulate prototypes (or 'theories') of what is 'valuable' or 'normal'. In Gee's words:

> "Discourse models" are "theories" (storylines, images, explanatory frameworks) that people hold, often unconsciously, and use to make sense of the world and their experiences in it. They are always oversimplified, an attempt to capture some main elements and background subtleties, in order to allow us to act in the world without having to think overtly about everything all at once. In this sense, they are like stereotypes, though we should keep in mind that all theories, even overt theories in science, are simplifications of reality that are meant to help us understand complicated realities by focusing on important things and leaving out some of the details. (2005: 61)

What Gee proposes is a theory of mind that recognizes and recycles patterns. He gives the example of the "American success model" (borrowing from D'Andrade 1984), which holds that people can be successful in the United States if they work hard enough. This may or may not be true, but it is a widely-held model within the United States that can steer a conversation about a poor person to the conclusion that the person is somehow a 'failure' or 'lazy' because they failed to work hard enough to achieve success. In other parts of the world (or in different sociocultural contexts), the same poor person may be subject to different discourse models, and thus viewed quite differently. It is worth

noting that pattern retrieval is also essential in forming socially recognized identities, intertextuality (i.e. 'cutting' and 'pasting' one discourse within another), and 'Conversations' (or long, running social debates).

So, for Gee, Discourse Analysis should always take into account cognitive forces (i.e. our tendency as humans to recognize patterns in our experiences and reapply those patterns to facilitate future interactions, knowing that our interlocutors operate similarly), linguistic forms/functions (i.e. the potential meanings that are associated with words or grammar), and context or setting (which includes such factors as time, location, interlocutors, apparent identities, culture, history, etc., and which constitutes a medium in which meaning can be created). Cognition, meaning, and context act reflexively upon one another in such a way that each shapes and is in turn shaped by the other two factors.

Within a given context, and given our cognitive predispositions, according to Gee, we use language to construct our reality. Sometimes we do this in novel ways, and other times we do this routinely, but we are always engaged in the construction of meaning. Gee maintains that discourse analysts can identify what reality is being constructed by asking seven questions. They are:

1. How is this piece of language being used to make certain things significant or not and in what ways?
2. What activity or activities is this piece of language being used to enact (i.e. get others to recognize as going on)?
3. What identity or identities is this piece of language being used to enact (i.e. get others to recognize as operative)?
4. What sort of relationship or relationships is this piece of language seeking to enact with others (present or not)?

5. What perspective on social goods is this piece of language communicating (i.e. what is being communicated as to what is taken to be 'normal', 'right', 'good', 'correct', 'proper', 'appropriate', 'valuable', 'the ways things are', 'the way things ought to be', 'high status or low status', 'like me or not like me', and so forth)?
6. How does this piece of language connect or disconnect things; how does it make one thing relevant or irrelevant to another?
7. How does this piece of language privilege or disprivilege specific sign systems (e.g. Spanish vs. English, technical language vs. everyday language, words vs. images, words vs. equations) or different ways of knowing and believing or claims to knowledge and belief? (2005: 11-13, 110)

As with any qualitative or ethnographic research, the issue of validity comes into question. Gee maintains that if the answers to all of the above questions converge on a single interpretation, and as analyses of related data (even perhaps by different researchers) coincide, validity is greatly enhanced. Of course, any analysis should be tightly tied to the linguistic structure of the 'social language' (dialect or register), and NSs of that 'social language' must agree that the forms and structures can convey certain meanings or serve particular functions within a given context.

In addition to Gee's framework, I use some Conversation Analysis conventions (cf. Schegloff 2007), particularly in transcriptions and analyses of turn-taking organization, laughter and repair/LRE sequences. Haakana (2001) argued that, in certain situations, particularly those that involve unequal footing between speaker and interlocutor, laughter occurs in "extremely organized ways" (2001: 213). She looked specifically at patients in medical consultations and noticed that they used laughter in

instances where their talk was at odds with the talk expected of a good and reasonable patient, but she also noted that speakers have the ability to adapt laughter to any situation (214). Because laughter is a readily-transferrable pragmatic/conversation management device, it is likely to appear frequently in NS-NNS dyads, especially those in which the NNS has very limited proficiency and therefore a limited repertoire of such devices. As such, laughter may have a pragmatic function of projecting solidarity or amusement, or it may be used more as a tool to manage certain conversational sequences, such as repair.

Repair is defined as a set of conventions speakers use to identify and potentially resolve problems in speaking, hearing and/or understanding (Sidnell 2010; Sacks, Schegloff, & Jefferson 1974). They can be initiated by the speaker (self) or the interlocutor (other), and likewise they can be resolved by either the speaker or the interlocutor. The three main features of a repair sequence are (1) repairable item or 'trouble source', (2) the repair initiator, and (3) the repair itself (Sidnell 2010).

Schegloff, Jefferson, and Sacks (1977) noticed a strong empirical bias towards self-correction and repair over other-correction and repair. The reason for this preference may be organizationally motivated: since the speaker (self), who utters the trouble item, has the floor, they have the first opportunity to initiate a repair sequence, either by interrupting their current turn or by taking up another turn. It is not until the speaker finishes a turn, that the interlocutor has a chance to act. Yet another reason might stem from politeness theory (Brown & Levinson 1978, 1987).

Brown and Levinson (1978, 1987) base their model of politeness on Goffman's (1967) notion of *face*, or one's public self-image or self-esteem. There are two aspects to face: positive face and negative face. 'Positive face' derives from one's desire to be liked and accepted by others. Positive politeness responds to this desire and is characterized by speech acts aimed at achieving solidarity. 'Negative face', on the other hand, stems from

one's desire to act freely, without the imposition of others. Negative politeness, therefore, is characterized by speech acts indicating deference and indirectness.

Some speech acts, such as complaints and disagreements, or other acts, such as ignoring someone, can be perceived as a threat to either positive or negative face. Speakers can damage their negative face by doing anything that indicates succumbing to an interlocutor's wishes, such as accepting an offer or an apology. Conversely, a speaker may damage an interlocutor's negative face by proposing anything that would constitute an imposition, such as an offer or request (Brown & Levinson 1987).

Speakers might damage their positive face by distancing themselves from their interlocutor(s), for example, by accepting a compliment or apology. They might also damage their interlocutor's positive face by showing indifference to them, for example, through excessive interruptions, or by negatively evaluating or criticizing them. This last point is particularly relevant to any discussion on the preference for self- as opposed to other-initiated repair, because other-initiated repair, especially that which is not absolutely necessary, constitutes a threat to the positive face of the one who uttered the trouble source. It is, therefore, not surprising that Schegloff, Jefferson, and Sacks (1977) noted that an interlocutor will tend not to initiate a repair sequence immediately at the first transition relevance place, but rather delay a turn subsequent to trouble-source turn as though to give the speaker an additional opportunity to self-repair and, in so doing, not threaten their positive face.

Indeed, many scenarios might arise in which conversation management or other pragmatic elements might come into conflict within the context of interactive language learning. For example, the expectation that a NS should 'correct' a learner's non-targetlike forms through recasts, or a NS's need to initiate a repair sequence, must be weighed against potential threats to the learner's positive or negative face. Such

dynamics of NS-NNS interactions are naturally lost in a more reductionist singling out of one particular element as a 'magic bullet' of interactive language acquisition, or even the tacit assumption that a particular element may have no negative repercussions in other domains that also bear on language acquisition.

2.3.3 Metacognitive markers.

As I argued earlier in this chapter, language learning is a conscious process. Markers of conscious, or metacognitive activity, are those that are indicative of the most fundamental elements of human consciousness: planning, monitoring and evaluating (Flavell 1979; Meijer, Veenman & van Hout-Wolters 2006). Such events can manifest themselves through stalls, self-monitoring (both pre- and post-verbal) and self-repair (Levelt 1989; Schegloff, Jefferson & Sacks 1977). Stalls normally indicate that a speaker is planning an utterance or reformulation. Self-repair is evidence that a speaker noticed an error (through self-monitoring) and upon evaluation, judged it to be worthy of reformulation. Retrospective and think-aloud protocols can offer additional evidence of planning monitoring and evaluating. Again, this can be viewed as a repetitive process whereby the outcome of one iteration serves as the input for subsequent iterations, which over time amplifies systemic chaos yielding different communicative habits.

It follows that this basic, recursive metacognitive sequence (planning, monitoring and evaluation) is also at play in most, if not all, IDs associated with language learning because self-evaluation (such as that which takes place on ID tests) is unlikely to occur without metacognitive precursors, including planning and monitoring. It seems plausible given that metacognition is (perhaps simultaneously) at play in both L2 linguistic development and in ID formation. If it just so happens that evaluations derived from one

domain are applied to metacognitive processes within another domain, then shifts in one domain might accompany shifts within another. It is easy to imagine, for example, a scenario where learners attempt to engage a NS on a topic, and are subsequently embarrassed by their self-perceived lack of linguistic or pragmatic ability. These learners might then avoid that topic in the future, which, in turn, might limit their linguistic development in that domain. This pattern might also cause an extroverted learner to become more introverted in that context, and perhaps even other contexts. This illustrates how the cross-pollination of metacognitive processes may affect both linguistic development and IDs (in this case, personality).

Many studies attempt to establish a link between metacognition and language acquisition/use. Rispoli, Hadley, and Holt (2008) looked at the dichotomy between stalls (i.e. pauses in speech) and revisions (i.e. utterance repair) in L1 acquisition. They found that while the frequency of stalls remained roughly consistent, revisions developed along with linguistic complexity but were absent in early stages of acquisition. They argued that this development in revisions paralleled the development of children's ability to monitor their own speech. This observation may suggest that the ability to monitor (a metacognitive/metalinguistic skill), to the extent that it is absent in early L1 acquisition but fully present in adult SLA, may contribute to so-called 'critical period' constraints on SLA.

With regard to language use, Lackner and Tuller (1979) found that speech errors are less likely to be detected when speakers cannot hear themselves. This finding would suggest that the monitor is quite active during language use (see also Levelt 1989).

Admittedly, the literature is much scarcer on the role of metacognition in ID formation than in language learning/use. Again, the majority of the literature perpetuates the same linear relationship whereby IDs influence metacognition, but not vice-versa

(e.g. Kelemen, Frost & Weaver 2000; Sternberg 1998). The notable exception to this, as previously noted, is Dörnyei and Ottó (1998), who see the metacognitive process as both the progenitor and the result of motivation. Regardless, it would seem obvious that any self-evaluation, such as that which occurs on many ID questionnaires, must employ metacognitive resources (see Table 1 above).

Taken together, the potential metacognitive link between SLA and IDs can shed a more holistic light on the transformative nature of second language learning. For example, if shifts in IDs correlate with high instances of stalls or self-repairs, then it may be that second language learning does have a significant impact on one's sense of self. Moreover, if it can be shown that certain metacognitive processes are common to both acquisition and ID formation, then we can begin to unite what is still considered two different fields of research into a more reciprocal relationship. This scenario could open a host of questions to further research. For example, which IDs are most sensitive to the emergence of linguistic and pragmatic competence? What other domains does linguistic metacognition affect?

2.4 Research Question

One of the tenets of DST, as stated by De Bot, Lowie and Verspoor (2007) is that "all variables are interrelated and therefore changes in one variable will have an impact on all other variables that are part of the system" (8). If this is true, then the act of engaging in language learning, indeed the act of learning anything, is bound to change the learner. Such a change may be short-term, long-term, cataclysmic or imperceptible, but it must occur nonetheless if DST is to have any relevance in the social sciences. The

overarching research question of this dissertation is thus: **Do IDs vary in conjunction with language learning/use, and if so, how?**

In this question, the IDs under focus will be personality traits, motivation and language aptitude as defined by Dörnyei (2005) and as measured by various instruments, such as those previously described. By narrowing down the list of IDs, it will be possible to combine unaltered, previously-validated instruments into a 'hybrid' ID test that can be completed in less than thirty minutes. The reasons for selecting these particular traits are fourfold: (1) they are among those that are most heavily researched; (2) they include traits generally treated as highly stable (i.e. personality and aptitude) as well as traits thought to be more subject to fluctuation (i.e. motivation); (3) they include traits typically measured metacognitively through self-reporting (i.e. motivation and personality) as well as traits measured through cognitive tests (i.e. aptitude); and (4) taken together, they answer Dörnyei's (2009:235) call to consider IDs as "amalgams or constellations" rather than modules. Thus, the idea is not to fully describe the learner (which I would argue to be an impossible task), but rather to find varied ID markers that will detect systemic fluctuations within the agent/learner as they engage in the language-learning process.

Generally speaking, I hypothesize that IDs and language learning/use are indeed in a reciprocal, dynamical relationship with one another and that a learner's traits are apt to shift even in the span of a single interaction. I have laid out my hypotheses more specifically in Section 3.3 in order to relate them directly to my methodology.

I tested motivation following Gardner et al.'s (1997) Attitude and Motivation Test Battery (AMTB), personality using John's Big Five Inventory (BFI) (John, Naumann & Soto 2008; and John, Donahue & Kentle 1991), and working memory using an online test that very closely replicates Daneman and Carpenter's (1980) instrument. Each of these instruments is in current use and was developed by leading researchers in the field.

Indeed, Gardner pioneered the study of motivation in SLA (cf. Gardner & Lambert 1959; Gardner & Smythe 1981; Gardner 1985) as Daneman and Carpenter (1980) did for working memory. I decided to substitute working memory for language aptitude for a few reasons:

(1) The modern language aptitude test (MLAT) is only commercially available and highly secure. I could not truthfully consent to their requirements for purchasing the instrument;

(2) Working memory is an individual cognitive trait that is highly correlated with L2 learning, and is indeed tested by most language aptitude instruments (Dörnyei 2005);

(3) Taking the MLAT multiple times would be excessively tedious for the participants. Moreover, there is a much greater concern that prior exposure may invalidate future results (hence the high security). This issue does not appear to be as great of a concern for working memory tasks because they do not involve such higher order items as identifying syntactic relationships, which can be studied and learned; and

(4) The working memory span test only has a single scale as opposed to the MLAT, which has 5 subscales. This scale would mean far less cumbersome statistical analyses.

I excluded the ID of cognitive styles altogether because it appears to be the most theoretically murky of the IDs that are associated with SLA (see Dörnyei 2005), and including it in the test might make the instrument impractically long. Moreover, working memory span, I believe, adequately represents the cognitive dimension in SLA.

These particular IDs were selected on the basis that (1) they were identified by Dörnyei (2005) as among the primary traits that interact with second language acquisition, and (2) because they have been previously validated and they have established baseline test-retest reliability correlations that will serve as a control factor for this study (c.f., John & Srivastava 1999 [BFI]; Waters and Caplan 1996 [Reading Span]; Gardner & Smythe (1981) and Gardner (1985) [AMTB]).

Language learning and use for the purposes of this study are operationalized as spontaneous interaction between a learner and a highly-proficient speaker. For methodological reasons described below, interactions are computer-mediated. While interaction cannot be claimed as the sum total of language learning, it is widely accepted that it is a significant component and even 'crucially' enhances language learning (Long & Robinson 1998) (see Chapter 2 for an in-depth discussion on this matter). Moreover, it is an ideal environment for dynamic modeling, since it evidences both the learning process and its results. For the purposes of this study, I look at interaction as an opportunity for both language learning and language use. I therefore use these terms somewhat interchangeably, a concept that is quite at ease with theories of 'situated' learning (cf. Lave & Wenger 1998) that see learning and participation as one and the same.

Whether or not learning is additionally taking place outside of the interactions is not controlled; first, because DST relieves us of the responsibility – indeed the possibility – of controlling for all potential intervening variables, and second, because it suffices to say that language learning evidenced by the interaction sessions (though perhaps not entirely the result of the sessions) coincides with shifts in ID traits.

As discussed in Chapter 2, elements of the language learning process include:

1. Language-related episodes (LREs), including recasts, meaning negotiations, clarification requests, confirmation checks and meta-linguistic explanations (Mackey 2007)
2. Conversation management and pragmatic markers skills, such as topic nominations and laughter;
3. Metacognitive episodes that indicate attention to linguistic form or the tripartite cycle, discussed in Chapter 2, of planning (e.g. a long pause, or "Maybe I should try to say _____"), monitoring (reading aloud while typing), and self-evaluations (e.g. "I'm trying to say _____ but I can't seem to get it right")

Whereas language-related episodes, conversation management and pragmatic markers are readily apparent in the text-based chat data, metacognitive data are drawn primarily from the think-aloud protocol.

The goal is, thus, to relate these events that occur through the course of an interactional sequence to the pre- and post-interactional ID profiles and look for patterns in an effort to build a model. Perhaps excessive recasts impede motivation. Perhaps negative self-evaluations would make a participant's score on the personality inventory more 'introverted' after a session. Perhaps successful topic nominations might make a participant see themselves as more 'extroverted'. Perhaps particularly negative self-evaluations may cause distractions on the reading span test. It is possible that some common patterns among the learners might be identified but, more likely, each learner has idiosyncratic tendencies. Again, DST does not use linear logic, which means that one seemingly minor self-evaluation could potentially have a greater impact on IDs than twenty recasts. Moreover, it is very unlikely that this exercise yields any model with

long-range predictive powers, because human behavior, much like Lorenz's weather patterns, is extraordinarily complex and subject to chaos. The purpose of this dissertation is to illustrate that personal traits, or IDs, are not inherently stable and are capable of being impacted by language learning and use, just as they impact the process of language learning and use.

It is generally accepted that different learner variables yield different language learning outcomes (i.e. a different person is more likely to become proficient in this language than I can). My hypothesis is essentially that the converse is also true; namely, that learning a language yields different learner variables (i.e. in becoming proficient in this language, I am more likely to become a different person) (cf. Kinginger 2004). I will illustrate my hypotheses more specifically in Section 3.3, after describing how variables are measured and coded.

Chapter 3: Methodology

3.1 METHODOLOGY

This study involved a 15-week longitudinal study (8 sessions total) of 14 Spanish learners. Of these, 8 participants completed all of the sessions and one additional participant completed 4 of the sessions. The remainder missed excessive appointments or elected to leave the study.

3.1.1 Participants

The participants that completed the study are identified by their pseudonyms: Lori, Sandra, Sally, Jessica, John, Casey, Haley and Erin. All participants, with the exception of Erin, were between the ages of 18 and 20 and all participants, with the exception of John, were female. None of the participants, except for Casey, were significantly exposed to Spanish before high school (even Casey had very limited exposure to cousins that live in Argentina). Finally, all of the participants were students at St. Edward's University: Lori, Sandra, Sally, Jessica and John were in second-semester Spanish, while Casey and Haley were in fifth-semester Spanish and Erin was in sixth-semester Spanish. All Spanish classes at St. Edward's University meet for three hours per week.

3.1.2 Treatments and Procedures

At each weekly session, the participants were given the randomized, hybrid ID test, discussed earlier. They then participated in a spontaneous, synchronous computer-mediated chat session with an unknown interlocutor of near-native or native proficiency.

Most of the time, the interlocutor, Emilia, was a 33-year-old female native of Peru with a post-secondary education, and English skills that were roughly Intermediate-High with respect to the ACTFL speaking guidelines. She had been living in the United States for fewer than ten years at the time of the study. On the very few occasions when she was unable to be present at an appointment, another native or heritage speaker would substitute.

The reason for selecting computer-mediated interaction, as opposed to face-to-face interaction, was to allow for a think-aloud protocol, which permitted both qualitative and quantitative analyses of the data. Participants were initially instructed to try to avoid remaining silent during the think-aloud protocol; however, they were not coached as to the preferred topics for the think-aloud, nor did they receive any feedback either during or after the sessions. The interlocutor simply reminded them at the beginning of each session to ensure that their microphone was turned on and that their recording levels (shown on screen) were adequate. The instructions given are detailed in Appendix A1. The interlocutor did not hear any of the participants' comments either during or after the interactions. After the chat session, the participants retook the ID test, again with test items being presented in random order. The participants and the interlocutors were all compensated roughly $7.25 per each of the 8 data collection sessions.

This methodology was piloted in a single session using a single participant from my second-year Spanish class at the University of Texas at Austin. The male participant completed an online personality questionnaire based on the MBTI, and then proceeded to an online chat session with an Assistant Instructor in the Spanish and Portuguese department. At first, he mainly verbalized what he was typing, remaining silent during pauses. As time went on, I began to ask him "What are you thinking right now?" whenever he was silent. This technique yielded quite a bit of metalinguistic and

metacognitive data, though it was not completely spontaneous. At the end of the interaction, the participant completed the same online personality questionnaire and was assigned a different profile altogether. Upon debriefing, the participant acknowledged that he felt much 'stronger' in his self-assessment after the interaction. Since it was only a single half-hour session, it was difficult to infer any linguistic growth. Thus, it appeared that my hypothesis held promise.

3.2 Data Analysis

In the present study, on each hybrid ID test, there were 75 items measuring a total of 9 learner traits (= ID subscales, which are detailed in Table 2 below). Within each subscale, the mean response value for negatively keyed items was subtracted from the mean response value of the positively keyed items, yielding a single mean response value for each subscale. Thus, each hybrid ID test was coded in terms of nine numeric values, each corresponding to a single subscale. The 9 subscales are detailed in Table 2 below.

3.2.1 Pre- to post-session ID shifts.

The first task in analyzing the data was to calculate short-term ID fluctuations (i.e. pre- to post-session changes in each of the subscales listed above) for each participant and determine which of these shifts were 'real' and which shifts were likely the result of 'noise' or measurement error. The critical value of Student's t-distribution (which is similar to a normal distribution or 'bell curve', except that it accounts for small sample sizes) was used to calculate the p-value of the observed pre- to post-session shifts. P-values less than .05 were considered to indicate statistical significance and that a 'real'

Personality (5 subscales)

Openness: 5- point Likert scale with 5 indicating most inventive/curious and 1 indicating most consistent/cautious

Conscientiousness: 5- point Likert scale with 5 indicating most efficient/organized and 1 indicating most easy-going/careless

Extroversion: 5- point Likert scale with 5 indicating most outgoing/energetic and 1 indicating most shy/reserved

Agreeableness: 5- point Likert scale with 5 indicating most friendly/compassionate and 1 indicating most cold/unkind

Neuroticism: 5- point Likert scale with 5 indicating most sensitive/nervous and 1 indicating most secure/confident

Motivation (3 subscales)

Attitudes towards learning Spanish: 7-point Likert scale with 7 indicating most favorable views towards learning Spanish (5 positively keyed items, 5 negatively keyed items)

Desire to learn Spanish: 7-point Likert scale with 7 indicating strongest desire to learn Spanish (5 positively keyed items, 5 negatively keyed items)

Motivational intensity: 7-point Likert scale with 7 indicating greatest motivational intensity (5 positively keyed items, 5 negatively keyed items)

Reading Span (1 subscale)

Recall that at level one, participants were given a single sentence and asked to duplicate the final word of that sentence. After successfully completing three trials at that level, they proceeded to the next level, in which they were given two sentences to duplicate the final word of each sentence, again successfully completing three trials before continuing, and so on. One point was assigned for each level completed, and .33 points were assigned for each trial successfully completed at the final level. Students were given a password so that their progress could be tracked by the researcher.

Table 2: Hybrid ID test subscales

change in a particular subscale had actually occurred over the course of the session. Since this test for significance was done for each subscale at each session for each

participant, it could be claimed, for example, that during the course of Session 3, Participant A exhibited a significant increase in motivational intensity, desire to learn Spanish and levels of neuroticism, a significant decrease in attitudes towards learning Spanish, reading span, and levels of openness and conscientiousness, and no significant change in levels of agreeableness, and extroversion. This technique amounts to a statistical test for the stability of a participant's ID profile during a given session.

The relative stability (or instability) of ID variables were then considered within the context of the interactions themselves. Sessions that exhibited a 'real' positive shift in a particular ID subscale were compared against sessions that exhibited a 'real' negative shift in the same subscale in order to determine how such shifts, which presumably occurred over the course of the session, might be related to language-learning processes discussed in Chapter 2. These processes were signaled by language-related episodes (e.g. recasts, clarification requests, and meaning negotiations), conversation management and pragmatic markers (e.g. topic nominations and laughter), and metacognition (e.g. planning, monitoring, and evaluation). For example, if a particular participant showed a significant, positive shift in motivational intensity over the course of Session 1 and a significant, negative shift in motivational intensity in Session 2, then Sessions 1 and 2 were contrasted to see if the shift could be attributed to certain elements that were evident in one session but not the other. Other sessions were not analyzed, because the lack of statistical significance makes it impossible to determine whether the shift was *actually* positive, negative, or zero. The ID measurements are naturally subject to a certain degree of error/uncertainty, and only those that have surpassed a confidence threshold of $p=0.05$ can be treated as 'real' shifts.

Typical errors of measurement were calculated for each participant individually, and not for the group as a whole. Moreover, sessions were not compared across

participants. Instead, one participant's sessions were compared only to other sessions involving the same participant. This focus on individual idiosyncrasies and patterns is critical to the emergentist/dynamical systems perspectives. Larsen-Freeman (2006) makes a similar observation.

> Viewing the data in this way shows that averaging group data as I have done has its limitations. Group data may often describe a process, or a functional relation, that has no validity for any individual (Sidman 1960). Thus, if we were to disaggregate the data, we would see a rather different picture. (598)

Following this view that individual variation reveals the nature of the processes involved in SLA, comparisons are first done at the individual level, and then common trends among the participants are identified.

Often, a participant did not experience both a significantly positive and a significantly negative pre- to post- session shift in the same subscale over the 8 sessions. In this case, the next-best option is to compare two sessions whose outcomes were significantly different *from one another*, rather than significantly positive or negative in their own right. To determine whether or not the difference between two shifts is significant, the critical value of Student's t-distribution was used to calculate the p-value of the difference between the mean shifts. Again, p-values less than .05 were considered significant.

The mean and standard deviation for the t-distribution of differences among pre- to post-session shifts was calculated as shown in Figure 2 below. Additionally, after each chat session, the interlocutor was asked to rate the participant's proficiency using an informal 10-point Likert scale. The participants were not aware that they were being explicitly evaluated, and the rankings were primarily meant to ascertain whether their self-evaluations were in line with those of the interlocutor.

If i and j represent two sessions, and x represents a pre- to post-session shift, then

$y = x_i - x_j$

$\mu(y) = 0$

$\sigma(y) = \sqrt{var(y)} = \sqrt{var(x_i) + var(x_j)} = \sqrt{2var(x_i)} = \sqrt{2}\sigma(x_i)$

The variance of x_i and x_j are equal because they come from the same data set.

Figure 2: Calculation for t-distribution of differences among pre- to post-session ID shifts

3.2.2 Long-term ID shifts.

The second task in analyzing the data was to track any long-term shifts in IDs. Pearson test-retest correlations were used and the same approximate time intervals were selected in order to compare the results of this study with baseline values established by John & Srivastava (1999) for the Big-Five Inventory (BFI), Waters and Caplan (1996) for the Reading Span test, and Gardner (1985) for the Attitude and Motivation Test Battery (AMTB). Additionally, critical values of a t-distribution were calculated in order to determine the significance of the shift. The test-retest correlations alone are not capable of painting a complete picture because the correlations would remain high even if all participants showed a 'drastic' shift, as long as the rank-order remained the same (i.e. as long as each participant exhibited the same degree of shift). One of the advantages of the methodology used in the present study that takes many repeated measures over time is that the measurement error can be more precisely determined and thus can come closer to determining not only if the rank-order is stable, but more importantly if the traits themselves are stable.

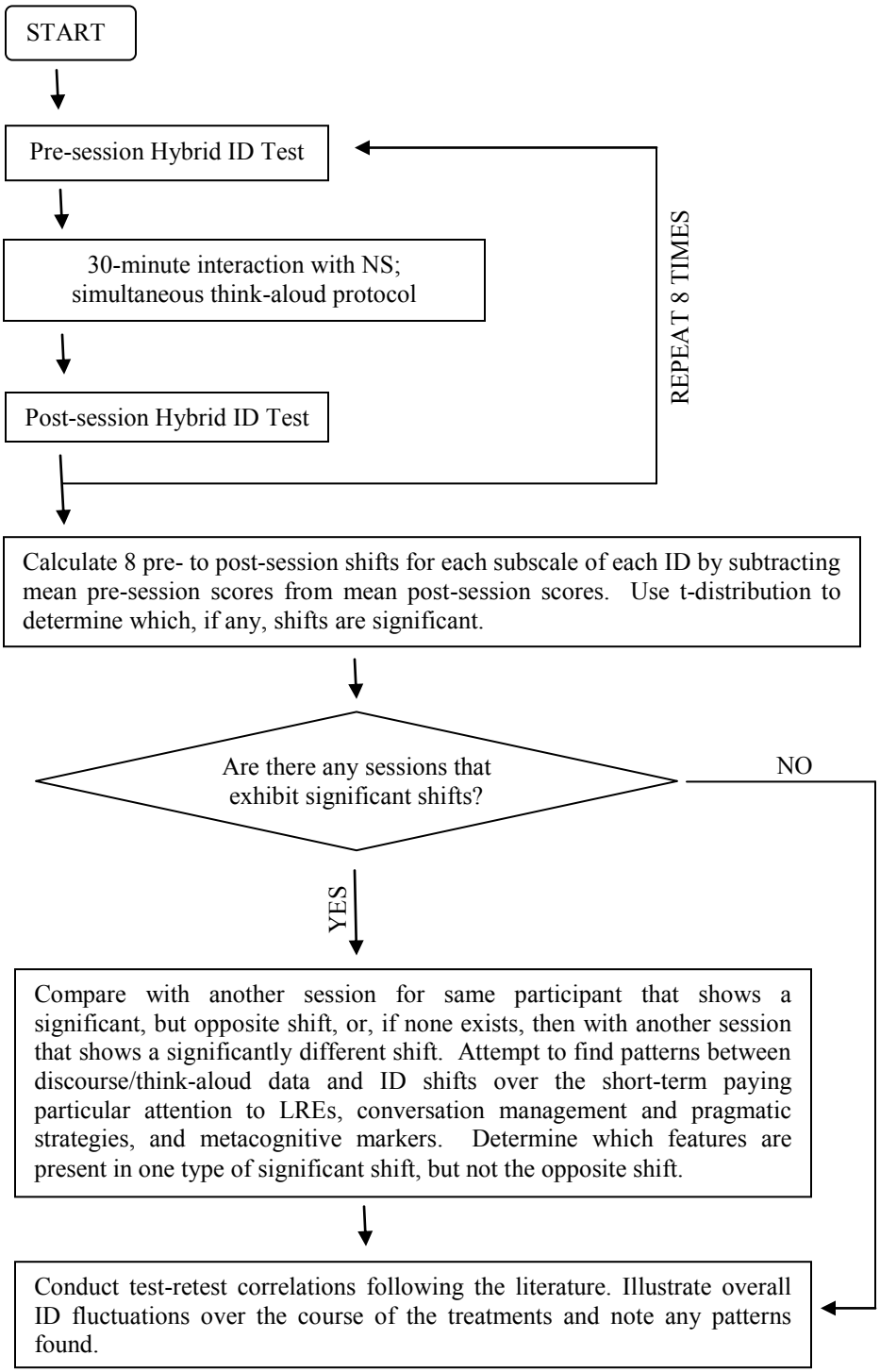

Figure 3: Methodological flowchart for analyzing pre- to post-session shifts for each participant

3.3 HYPOTHESES

My hypotheses are as follows:

H1: The average r-values of the test-retest correlations for the study group will be lower than previously established baseline values (c.f., John & Srivastava 1999 (BFI), Waters and Caplan 1996 (Reading Span), Gardner 1985 (AMTB)), indicating that such correlations may be context-dependent. A natural assumption would be that the context presented in this study is inherently less stable than more highly-controlled laboratory situations, which may entice participants to project a more stable self-image. If this hypothesis is confirmed, it will help explain how IDs can be cast as both stable (as in the literature) and unstable (as in this dissertation), without discrediting either.

H2: A participant's pre- and post-interactional ID profiles may measurably and significantly fluctuate within the span of a single interaction, after measurement errors are taken into account.

H3: Those sessions with significantly positive ID shifts will be qualitatively different in terms of language-related episodes, conversation management and pragmatic markers, and metacognition from those with significantly negative ID shifts. Results will vary among participants. This hypothesis looks at each participant as an individual case study and does not attempt to aggregate the interaction data nor the results of the ID tests among participants.

H4: Overall, the data will be so idiosyncratic and fractal that no linear patterns (e.g. greater meaning negotiations = greater integrative motivation) will be true for all participants in general. Of course, it would strengthen the claims made in this dissertation if a particular interaction between IDs and certain discursive features were strong enough to hold across all participants and this hypothesis were rejected. Still, I see that as an unlikely scenario. Either way, however, this hypothesis merits testing.

Chapter 4: Case Studies

4.1 INTRODUCTION

The data analyses contained in this chapter are organized into two main sections: the first (and by far the largest) portion (Sections 4.2 – 4.9) focuses on *short-term* ID profile fluctuations for each of the 8 participants. Short-term fluctuations were calculated by subtracting the mean pre-interaction score for a particular subscale of a particular ID from the mean post-interaction score for the same subscale (=[mean post-interaction score] – [mean pre-interaction score]). These calculations were done for each subscale of each ID (9 subscales in all) for each of the 8 participants and for each of the 8 sessions. Since IDs were measured immediately before and immediately after each interaction, it is likely that any shifts observed were at least partially influenced by the events that took place during the interaction itself. Interactions with significant ID shifts were then analyzed in terms of LREs, pragmatic/conversation management markers, and metacognitive markers (see Chapter 3 for a detailed discussion on these markers) in order to determine if they coincided with particular shifts. A summary of the major findings from all of the short-term analyses can be found in Section 4.10.

The second main portion of this chapter (Section 4.11) focuses on *long-term* ID shifts. Considerably less space is dedicated to such shifts precisely because it is less certain that they are related to events that transpired during the interactions, which were spaced at approximately two-week intervals. Indeed, given the time that passed between the treatments, it is far more likely that other variables might have come into play. The

second section, therefore, will be limited to illustrating individual trajectories (see Ellis & Larsen-Freeman 2006), and analyzing test-retest reliability.

Recall that there were 8 participants total: Lori, Sandra, Sally, Jessica, John, Casey, Haley and Erin. They are presented in no particular order. For organizational purposes, I followed the template shown in Figure 4 below for each of the participants.

CASE STUDY FOR PARTICIPANT X

1. ATTITUDES AND MOTIVATION: Table showing short-term shifts and rationale for selecting sessions (if any) to be analyzed
    a. Session A
        i. Language-related episodes
        ii. Conversation management and pragmatic markers
        iii. Metacognitive markers
    b. Session B
        i. Language-related episodes
        ii. Conversation management and pragmatic markers
        iii. Metacognitive markers
2. PERSONALITY: Table showing short-term shifts and rationale for selecting sessions (if any) to be analyzed
    a. Session C
        i. Language-related episodes
        ii. Conversation management and pragmatic markers
        iii. Metacognitive markers
    b. Session D
        i. Language-related episodes
        ii. Conversation management and pragmatic markers
        iii. Metacognitive markers
3. READING SPAN: Table showing short-term shifts and rationale for selecting sessions (if any) to be analyzed
    a. Session E
        i. Language-related episodes
        ii. Conversation management and pragmatic markers
        iii. Metacognitive markers
    b. Session F
        i. Language-related episodes
        ii. Conversation management and pragmatic markers
        iii. Metacognitive markers
4. SUMMARY OF RESULTS FOR PARTICIPANT X

Figure 4: Case study template

Sections 4.2 – 4.9 follow the above template and the final section of this chapter, Section 4.11 analyzes long-term shifts as discussed in Section 3.2.2.

4.2 LORI

At the time of the study, Lori was a 20 year-old female. She was currently enrolled in a second-semester Spanish course at St. Edward's university and had previously studied Spanish for one semester. She was a NS of English and spoke no other languages at home.

4.2.1 Attitudes and Motivation

Lori had the least predictable motivational tendencies of all of the participants, with a pre- to post-survey standard deviation of 1.07 (see Table 3 below) — over 15% of the 7-point Likert scale that was used to measure attitudes towards learning, desire to learn, and motivational intensity. As a comparison, the lowest pre- to post-survey standard deviation was 0.28 (4%), exhibited by Erin.

There is no evidence that the given task impacted Lori's attitudes and motivation negatively. Indeed, the average shift from pre- to post-chat session was slightly positive (0.0333) and the only significant pre- to post-session shifts were positive; i.e. they reflected more favorable attitudes towards learning Spanish and greater degrees of motivation to learn Spanish *after* the chat sessions were over. These substantial positive shifts are highlighted in Table 3 below. Therefore, it could be said that Lori experienced

a real (or significant [p=0.0373]), positive shift in Subscale 1 (=her attitudes towards learning Spanish) during her first chat session and in Subscale 2(=her desire to learn Spanish [p=0.0373]) after her eighth chat session.

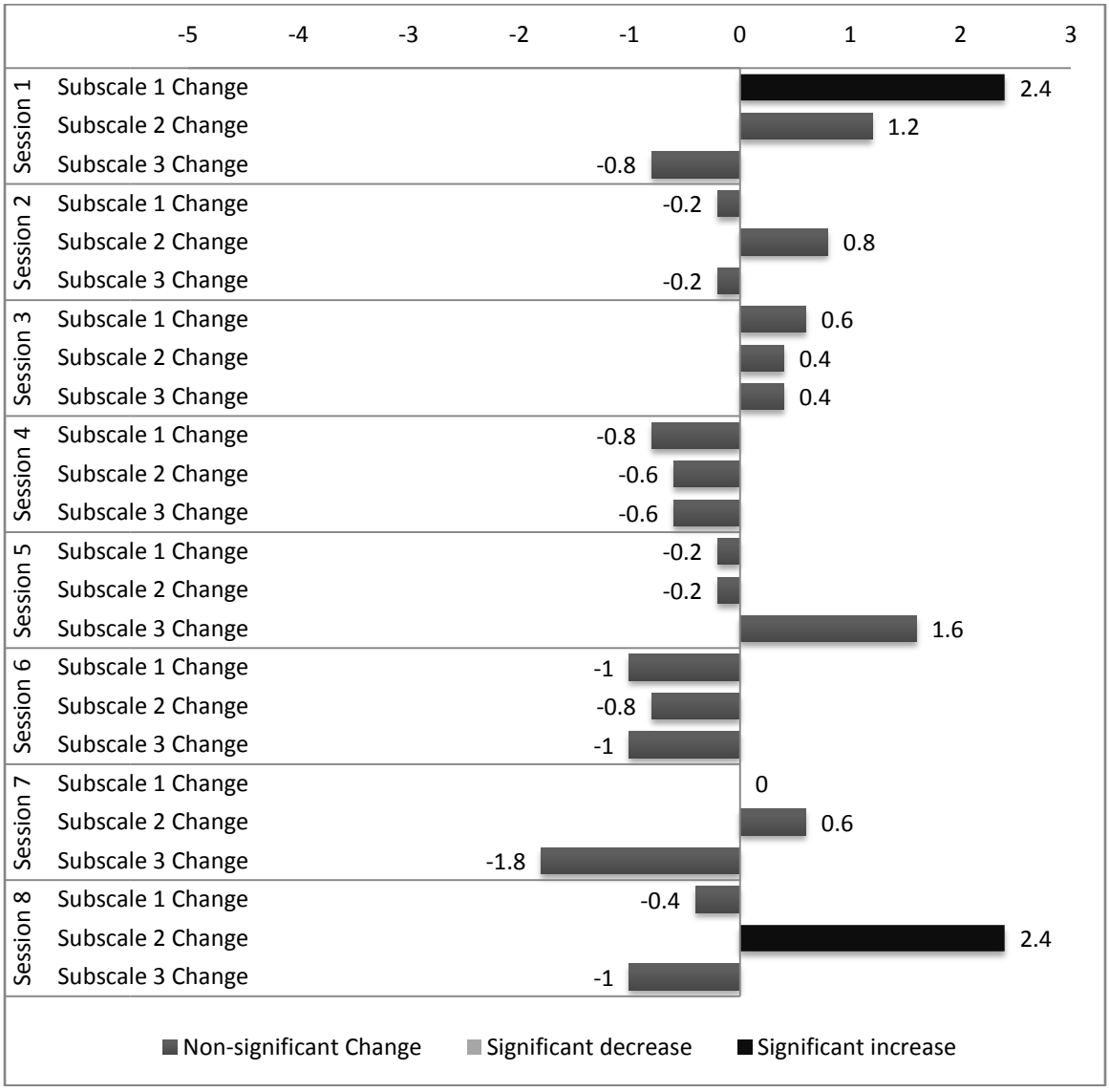

Table 3: Changes in Lori's AMTB items from pre- to post-session

The highlighted shifts represent an average improvement of 2.4 points, nearly 17% of the seven-point Likert scale used to measure the respective subscales. This raises two questions: (1) How could Session 8, for example, produce both a *positive* shift in Subscale 2 (desire to learn Spanish) and a *negative* shift in Subscale 3 (motivational intensity to learn Spanish); and (2) Are these shifts reflected in (and perhaps a result of) the interactions that took place between the pre- and post-surveys?

The answer to the first question is perhaps the most straightforward. In Session 8, the positive shift in Subscale 2 attained a level of significance, whereas the negative shift in Subscale 3 did not. Therefore, it is far more likely that the negative shift for Subscale 3 is due to measurement error than the positive shift in Subscale 2. Moreover, while it may seem counterintuitive that desire to learn and motivational intensity might pattern differently, since they both measure the same latent variable (i.e. motivation), the subscales were developed in such a way that consistency between the subscales has repeatedly tested lower than the consistency within each subscale (see Gardner & Tremblay 1994: 525).

The answer to the second question is complicated primarily by the fact that the significant, positive shifts cannot be compared against negative shifts of similar magnitude. I therefore selected Session 6 as a point of comparison because it showed the greatest negative shift in both Subscales 1 and 2 and because the difference between Session 1, Subscale 1 and Session 6, Subscale 1 *as well as* the difference between Session 8, Subscale 2 and Session 6, Subscale 2 are both significant ($p = 0.0173$ and $p = 0.0228$, respectively). It should be stated, however, that the strongest comparisons would

be made between a significantly *motivating* session and a significantly *demotivating* session. In the absence of a truly demotivating session, as is the case with Lori, the next best alternative is to draw comparisons between significantly motivating sessions and a significantly *less-motivating* session.

4.2.1.1 Session 1

Session 1 was moderated by Emilia. It lasted approximately 30 minutes and contained 510 words. There were a total of 113 entries; 44 were made by Lori, and the remaining 69 by Emilia

4.2.1.1.1 Language-related episodes

There were a total of 5 recasts, typically given in the second person as in Exchange 1.

Exchange1:

(1) 10:04 AM Lori: me mejor amiga came to visit me
(2) 10:04 AM Emilia: todo bien?
(3) 10:04 AM Lori: si
(4) 10:04 AM Emilia: tu mejor amiga vino a vistarte
(5) 10:04 AM Emilia: que bueno.[7]

(1) 10:04 AM Lori: 'my best friend' came to visit me
(2) 10:04 AM Emilia: 'everything OK?'
(3) 10:04 AM Lori: 'yes'
(4) 10:04 AM Emilia: 'your best friend came to visit you' ((recast))
(5) 10:04 AM Emilia: 'how nice.'

[7] All exchanges are represented as they appeared, without edits.

Additionally there were two lengthy clarification requests, one concerning the word *celosa* 'jealous' that lasted 13 TCUs[8] and required negotiation of other incidental lexical items, such as *envidia* 'envy', *celos* 'jealousy', and *ejemplo* 'example'. The second clarification request spanned 9 TCUs (see Exchange 2 below).

Exchange 2:

(1) 10:23 AM Emilia: te gusto el vals? [9]
(2) 10:23 AM Lori: muy rapido
(3) 10:23 AM Lori: vals?
(4) 10:23 AM Lori: como se dice en ingles?
(5) 10:23 AM Emilia: debes decir: me encantaria aprender a bailar salsa.
(6) 10:24 AM Emilia: si lo que tu bailaste con tu novio se llama vals en
(7) espanol
(8) 10:24 AM Lori: como se dice vals en ingles?
(9) 10:25 AM Lori: vals=Waltz?
(10) 10:25 AM Emilia: si

(1) 10:23 AM Emilia: 'do you like the waltz'
(2) 10:23 AM Lori: 'very fast'
(3) 10:23 AM Lori: 'waltz?'
(4) 10:23 AM Lori: 'how is it said in English?'
(5) 10:23 AM Emilia: 'you should say: I would love to learn to dance the waltz'
(6) 10:24 AM Emilia: 'yes, what you danced with your boyfriend is called *vals* in*'*
(7) 'Spanish'
(8) 10:24 AM Lori: 'how do you say *vals* in English?'
(9) 10:25 AM Lori: vals=Waltz?

[8] The turn construction unit (TCU), or the most basic unit of a conversation (Sacks, Schegloff, & Jefferson 1974). A TCU is defined as the smallest potentially-complete turn as determined by the context of the conversation. The end of a TCU, or the transition relevance place, is the point where another speaker may take the floor, or the current speaker may hold the floor through various means and begin another TCU. Due to the nature of the synchronous computer-mediated communication data collected in the present study (see Chapter 3 for a more in-depth discussion of methodology), it became clear that transition relevance places occurred only at the end of a text-based chat entries, since an entry appears to the interlocutor all at once. Thus, if there are two TCUs within a single text-based chat entry, I count them as a single TCU for the simple reason that the interlocutor does not perceive an opportunity to take the floor in the middle of an entry until it no longer exists.

[9] Because the data are taken from text-based chats, no orthographic or syntactic alterations were made.

(10) 10:25 AM Emilia: ‘yes’

None of the recasts, even those that were apparently noticed, surfaced later in the interaction.

4.2.1.1.2 Conversation management & pragmatic markers

Emilia nominated 6 topics of conversation, and Lori did not nominate any. They spoke about a variety of topics ranging from dancing to country music to going to the beach, and found common interests. The recasts did not spark significant repair sequences. Lori either continued without remarking or, in three instances, she said “whoops!” or “*gracias*” ‘thanks’. In all, the exchange was very lighthearted as indicated by the amount of ‘laughter’. Emilia entered the word *ja* nine times and *ha* six times. Lori entered the word *ha* 15 times. This production is interesting because Emilia started out using the more typical Spanish *ja*, but then switched to *ha*, even despite the lack of evidence that the *ja’*s were in any way impairing the interaction.

It appears as though Emilia tended to downplay her position as expert and accommodated Lori’s speech, which would explain her tendency to recast in the second person as though she were requesting clarification rather than giving instruction.

4.2.1.1.3 Metacognition

There was only one pause that lasted over a minute and, as indicated by the 133 entries made in 30 minutes, the interaction proceeded at a fairly rapid rate, due in part to

the fact Lori was not reluctant to codeswitch when necessary. Emilia rated Lori's proficiency at 6 (out of a 10-point Likert scale). Lori mentioned only once in the think-aloud that she was not certain what Emilia was asking. Otherwise, she remained silent or mumbled unintelligibly.

4.2.1.2 Session 8

Session 8 was moderated by Roberto. It contained 248 words and a total of 53 entries, 32 by Roberto and 21 by Lori. It lasted 31 minutes.

4.2.1.2.1 Language Related Episodes

In session 8, there were no recasts and only 2 other LREs. The first was an unsolicited explanation of the term *fiesta de estreno* 'housewarming party' and the second was a solicited explanation of the meaning of *piscina/alberca* 'swimming pool'.

4.2.1.2.2 Conversation management & pragmatic markers

Roberto nominated 5 topics and Lori nominated none. The conversation centered on Lori's work, the fact that she was in her final chat session (which appeared to please her), and Lori's excitement over having found a new apartment and the prospects of living alone for the first time. Interestingly, there was no codeswitching in this session, in contrast to Session 1, even though there were more systematic non-targetlike forms, such as the overextension of the second-person singular object clitic *te*, most notably in environments where the anaphor *ti* would be the standard.

4.2.1.2.3 Metacognition

Although there were no breakdowns in the interaction, Lori did pause for more than one minute on three occasions. Two of those resulted in Roberto either reformulating his question or asking Lori if she had understood him. She never indicated that there was any difficulty understanding, and there were no think-aloud data during those segments to determine whether they were due to conversational factors or momentary distractions that are not atypical during online chat sessions. Indeed, Roberto himself paused for more than one minute on one occasion when he had the floor. Again, Lori remained largely silent during the session, which makes any in-depth metacognitive analysis difficult. Roberto did compliment her on her improvement at the end of the exchange and ranked her proficiency at 8 using a 10-point Likert scale.

4.2.1.3 Session 6

In contrast to Sessions 1 and 8 (described above), which showed a positive shift from pre- to post-session AMTB test items, Session 6 showed the greatest negative shift in Subscales 1 and 2, which were significantly different from the shifts in the same subscales seen in Sessions 1 and 8 ($p = 0.0173$ and $p = 0.0228$, respectively). Since neither of the negative shifts was significant in their own right, Session 6 is carefully used as a counterpoint to the previous sessions. It lasted 44 minutes, longer than any of the other sessions; it contained 388 words, 34 entries by Lori and 42 entries by Roberto, the interlocutor.

4.2.1.3.1 Language-related episodes

There were a total of 2 recasts in Session 6, one concerning the lexical item *estricta* 'strict', and the other one representing the only overt pragmatically-oriented LRE (see Exchange 3 below).

Exchange 3:

(1) 10:38 AM Roberto: como estas?
(2) 10:38 AM Lori: muy bien gracias, y usted?
(3) 10:38 AM Roberto: muy bien
(4) 10:38 AM Roberty: me puedes tutear
(5) 10:38 AM Roberto: no soy tan viejo!
(6) 10:39 AM Roberto:
(7) 10:39 AM Lori: hahaha
(8) 10:40 AM Lori: en elementary escuela we had to say that

(1) 10:38 AM Roberto: 'how are you?'
(2) 10:38 AM Lori: 'very well thank you, and you (2SG.FRML)?'
(3) 10:38 AM Roberto: 'very well'
(4) 10:38 AM Roberty: 'you can address me informally'
(5) 10:38 AM Roberto: 'I'm not that old!'
(6) 10:39 AM Roberto:
(7) 10:39 AM Lori: hahaha
(8) 10:40 AM Lori: en elementary 'school' we had to say that

It should be noted that Lori issued informal greetings in all subsequent sessions. This marks the only LRE that showed evidence of subsequent uptake.

Additionally, there were four other LREs, including one misunderstanding of the imperfect aspect, one solicited clarification of the irregular preterite, *viste* ('see'.2SG.FAM.PST) and two comprehension checks. In all, there were far more LREs in this session than in Session 8, and only one fewer than in Session 1. Even though Session 1 contained more LREs, the session prior to Session 6 contained only three LREs

(or half the number of LREs in this session), which would suggest that Session 6 represented a countertrend. Lori acknowledged almost all of the recasts in the sessions analyzed, making it possible that Lori noted the unexpected jump in LREs as well as the novelty of a pragmatically-oriented correction.

4.2.1.3.2 Conversation management & pragmatic markers

Lori nominated one topic, while Roberto nominated seven. The pace of the interaction was slower than the others, with 7.7 as opposed to 8 words per minute in Session 8 and 17 words per minute in Session 1. The longer, slower-paced interaction was punctuated by 8 *ha*'s from Lori, as opposed to 9 in Session 8 and 15 in Session 1; this despite the fact that this session lasted nearly 50% longer than Sessions 1 and 8. What stood out in this interaction was the phrase *lo siento* 'I'm sorry', which occurred four times, or as many times as in the other two sessions combined.

4.2.1.3.3 Metacognition

The only evidence of self-evaluation in the sessions analyzed thus far occurred towards the end of this session (see Exchange 4 below).

Exchange 4:

(1) 11:04 AM Roberto: vas a estudiar espanol el proximo semestre?
(2) 11:04 AM Roberto: en tu universidad?
(3) 11:05 AM Lori: no. no mas espanol para mi. profesor Lyle es mi ultimo
(4) profesor.
(5) tome dos semestre
(6) 11:06 AM Lori: comprendo? lo siento mi espanol es muy mal
(7) 11:06 AM Roberto:

(8) 11:06 AM Roberto: si, comprendo, pero yo pienso que escribes bien!

(1) 11:04 AM Roberto: 'are you going to study Spanish next semester?'
(2) 11:04 AM Roberto: 'at your university?'
(3) 11:05 AM Lori: 'no. no more Spanish for me. Professor Lyle was my last
(4) professor.'
(5) 'I took two semesters'
(6) 11:06 AM Lori: 'do I understand? I'm sorry, my Spanish is very badly'
(7) 11:06 AM Roberto:
(8) 11:06 AM Roberto: 'yes, I understand, but I think that you write well!'

This sequence is unique as Lori acknowledges that she will no longer study Spanish and laments that her proficiency level is low. This instance is not the only one in which Lori reveals any negative self-evaluation (she does so twice in Session 5, for example), but such admissions are utterly absent from those sessions that exhibit positive shifts in AMTB items from pre- to post-session. Also, it should be noted that she was rated at 3 out of 10 on the informal proficiency scale, by far her lowest score.

4.2.2 Personality

Unlike Lori's AMTB profile, her BFI profile was not the most unpredictable of the group – in fact, her standard deviation (0.56) was the median value. Like Lori's AMTB profile, the only shifts in her BFI profile that attained a level of significance were unidirectional. Even though they are indicated as positive shifts in Table 4 below, recall that the personality traits are value-neutral, which makes the designation of positive versus negative purely arbitrary.

Interestingly, the 'positive' shifts occurred only in Subscale 1, which measures extroversion and includes more specific traits such as talkative, assertive and energetic.

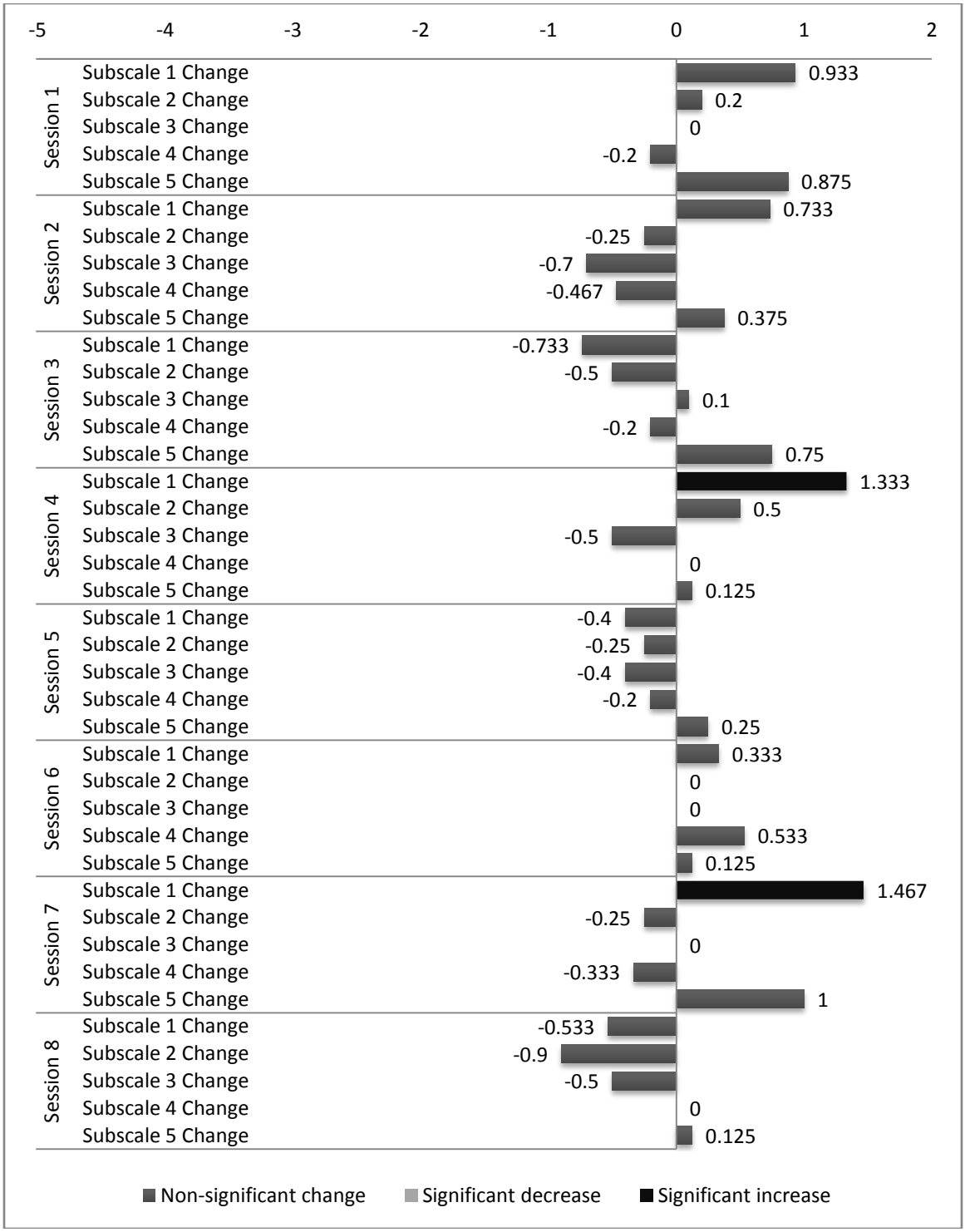

Table 4: Changes in Lori's BFI items from pre- to post-session

These traits, especially talkativeness and assertiveness, could be measured in the discourse through the number of words produced and topic nominations. Session 3 presents the most suitable counterpoint to Sessions 4 and 7, as it has the largest decrease in Subscale 1 from pre- to post-session. Again, although the negative shift is not significant, it is significantly less than the pre- to post-session shifts in Session 4, Subscale 1 and Session 7, Subscale 1 ($p = 0.0065$ and $p = 0.0043$, respectively).

4.2.2.1 Session 4

Session 4 lasted 39 minutes and contained 348 words that spanned 89 entries, 39 of which were made by Lori and the remaining 50 by Emilia, the moderator.

4.2.2.1.1 Language-related episodes

There were three unsolicited clarifications of the lexical items *invertir* 'to invest', *escuchar* 'to listen to' and *oregano* 'oregano'. These clarifications were usually given within the same TCU in which the lexical item appeared, rather than in response to an apparent misunderstanding. Additionally, Lori requested the Spanish translation for the phrase *nothing fun* and initiated a meaning negotiation of the lexical item *aprovechar* 'to take advantage of'. There was only one recast in which Emilia provided the Spanish equivalent of Lori's question, "Really?" No other instances of codeswitching were recast.

4.2.2.1.2 Conversation management & pragmatic markers

Emilia nominated 2 topics, while Lori nominated one topic in which she asked Emilia how she was enjoying the spring season. She also performed a positive face-threatening act by challenging Emilia's use of homeopathic remedies for allergies (see Exchange 5 below).

Exchange 5:

(1) 10:36 AM Emilia: mi profesora de yoga me dijo que usara "aceite de
(2) oregano"
(3) 10:37 AM Emilia: tengo que tratarlo
(4) 10:37 AM Emilia: una amiga de pakistan me dijo lo mismo
(5) 10:37 AM Lori: si?
(6) 10:38 AM Lori: aceite de oregano?
(7) 10:38 AM Lori: sounds gross

(1) 10:36 AM Emilia: 'my yoga teacher told me to use "oil of
(2) oregano"'
(3) 10:37 AM Emilia: 'I need to try it'
(4) 10:37 AM Emilia: 'a friend from Pakistan told me the same thing'
(5) 10:37 AM Lori: 'yes?'
(6) 10:38 AM Lori: 'oregano oil?'
(7) 10:38 AM Lori: sounds gross

In all, the conversation was very lively, with only one pause that lasted over a minute, but it occurred when Emilia had the floor. It appeared as though Emilia took some time to nominate the next topic. One topic in particular that dominated the conversation was Lori's final grades. She was very excited that she had done so well and Emilia was very congratulatory.

4.2.2.1.3 Metacognition

One feature of this interaction that is somewhat novel are Lori's self-corrections. Normally, she would not revise typographical errors nor would she modify non-targetlike verbal inflections. In this session she did both, as in Exchange 6 below.

Exchange 6:

(1) 10:39 AM Lori: comprende
(2) 10:39 AM Lori: comprendo*

(1) 10:39 AM Lori: 'understand (3SG)'
(2) 10:39 AM Lori: 'understand* (1SG)'

It is difficult to say that Lori was dedicating more resources than usual to monitoring and self-evaluating, but these successful self-corrections contrast with the apologies evidenced in Session 6. At the end of the session, Emilia rated Lori's proficiency at 6 out of a possible 10 points.

4.2.2.2 Session 7

Session 7 contained 349 words and lasted 43 minutes. It was the longest of the three sessions. Lori made 43 entries, while Roberto, the moderator, made 42. This session is the only one of Lori's sessions analyzed in which her entries outnumbered those of her interlocutor.

4.2.2.2.1 Language-related episodes

There were no recasts and one clarification request by Roberto, triggered by Lori's improper usage of the demonstrative pronoun, *esto* 'this'. The misunderstanding was resolved within the following TCU.

4.2.2.2.2 Conversation management & pragmatic markers

Roberto nominated 1 topic, and Lori nominated one. The interaction generally had a positive tone, touching on the recent Fourth of July holiday, and the Lori's new apartment and recent visits to her boyfriend. She also mentioned her hectic work schedule and joked about the Spanish she spoke with her coworkers at the restaurant in which she worked.

Lori used 14 *ha*'s. The majority of these were used in conjunction with *sí* 'yes'; their purpose seemed to be to intensify the agreement and establish/maintain solidarity in the absence of the ability to construct more complex responses. The remaining *ha*'s were apparently intended humorously.

4.2.2.2.3 Metacognition

On three occasions, Lori apologized for causing an apparent misunderstanding. On one of those occasions, she lamented that her Spanish was poor, and on a separate occasion, she was having difficulty expressing a concept, and showed her apparent frustration by typing, "*ah! espanol es muy dificil*". As a side note, it is not surprising, given the previous results with regard to the AMTB items, that these negative self-

evaluations coincided with an average negative shift in attitudes and motivation of 0.6 on the 7-point Likert scale that was used to measure these items. Roberto's ranking of Lori's proficiency was a 4 out of a possible 10 points.

4.2.2.3 Session 3

Session 3 was used as a counterpoint to Sessions 7 and 4, again, because it showed the largest decrease in Subscale 1 from pre- to post-session, which was significantly lower than the shifts in the same subscale for Sessions 4 and 7 ($p = 0.0065$ and $p = 0.0043$, respectively). Session 3 lasted 28 minutes and contained 329 words. Twenty-two entries were made by Lori and 22 were made by Emilia, the interlocutor.

4.2.2.3.1 Language-related episodes

There were no language-related episodes in Session 3.

4.2.2.3.2 Conversation management & pragmatic markers

Session 3 was extraordinary in that Lori nominated all of the topics. The first topic involved a homework assignment: Lori was required to ask a NS about smoking laws in Latin-American countries, and she elected to complete her assignment during this particular session (see Exchange 7, below).

Exchange 7:

(1) 10:03 AM Lori: Pregúntele a su compañero si él/ella fuma, y qué piensa
(2) de las
(3) leyes del tabaco. Escriba la respuesta de su compañero. ¿Está de acuerdo

(4) con
(5) él/ella? ¿Por qué?
(6) 10:03 AM Lori: mi tarea para espanol
(7) 10:03 AM Emilia: seguro. La pregunta me la haces a mi?
(8) 10:04 AM Emilia: o quieres que yo se la haga a mi companero(esposo)
(9) 10:05 AM Lori: no comprendo. lo siento
(10) 10:05 AM Lori: i have to ask you if there is a smoking law in Peru

(1) 10:03 AM Lori: 'Ask your partner if he/she smokes, and what they think'
(2) 'about the'
(3) 'tobacco laws. Write your partner's answer. Do you agree'
(4) 'with'
(5) 'him or her? Why?'
(6) 10:03 AM Lori: 'my homework for Spanish'
(7) 10:03 AM Emilia: 'sure. are you asking me the question?'
(8) 10:04 AM Emilia: 'or do you want me to ask my partner (husband)?'
(9) 10:05 AM Lori: 'I don't understand. I'm sorry'
(10) 10:05 AM Lori: i have to ask you if there is a smoking law in Peru

Lori essentially 'cut and pasted' her homework assignment, which caused some confusion probably due to the fact that it was in the third person and Emilia was not sure if it was a question or a command. Lori had trouble repairing the breakdown and eventually had to resort to her L1. Her subsequent topic nominations did not go very smoothly, either (see Exchange 8 below).

Exchange 8:

(1) 10:19 AM Lori: como es esquela?
(2) 10:20 AM Emilia: como es la escuela?
(3) 10:20 AM Lori: eh...Connecticut
(4) 10:20 AM Lori: no escuela?
(5) 10:21 AM Emilia: no entiendo tu pregunta
(6) 10:21 AM Lori: Como es Connecticut?
(7) 10:22 AM Lori: el tiempo
(8) 10:22 AM Emilia: oh, es un estado muy bonito, pero muy frio
(9) 10:22 AM Emilia: y muy caro
(10) 10:23 AM Lori: oh si??

(11) 10:24 AM Lori: cuanto usted vivo en Connecticut?
(12) 10:24 AM Emilia: 10 anos
(13) 10:25 AM Emilia: Lori, nuestra sesion esta por terminar.
(14) 10:25 AM Lori: oh ok

(1) 10:19 AM Lori: 'how is school?'
(2) 10:20 AM Emilia: 'how is school?' ((recast/meaning negotiation))
(3) 10:20 AM Lori: eh...Connecticut
(4) 10:20 AM Lori: 'no school?'
(5) 10:21 AM Emilia: 'I don't understand your question'
(6) 10:21 AM Lori: 'how is Connecticut?'
(7) 10:22 AM Lori: 'the weather'
(8) 10:22 AM Emilia: 'of, it's a beautiful state, but very cold'
(9) 10:22 AM Emilia: 'and very expensive'
(10) 10:23 AM Lori: 'oh yes??'
(11) 10:24 AM Lori: 'how much do you I live in Connecticut?'
(12) 10:24 AM Emilia: '10 years'
(13) 10:25 AM Emilia: 'Lori, our session is almost over.'
(14) 10:25 AM Lori: oh ok

It appears that Lori mistakenly assumed that Emilia was a student like herself. When Emilia did not understand her question, Lori abandoned the topic and moved on to the weather in Connecticut. This topic was successfully executed, but she appeared to be cut short when she opened up the topic of how long Emilia had been living in Connecticut. This session had less 'laughter' than the others, with only two *ha*'s from Lori and no *je*'s from Emilia.

4.2.2.3.3 Metacognition

There were three pauses that lasted for more than one minute, one when Emilia had the floor and two when Lori had the floor. There were no other overt markers of Lori's metacognitive processes. Emilia's ranking of Lori's proficiency at the end of the session was 6 out of a possible 10 points.

4.2.3 Reading Span

The changes to Lori's reading span from pre- to post-session are not very revealing. They are detailed in Table 5 below.

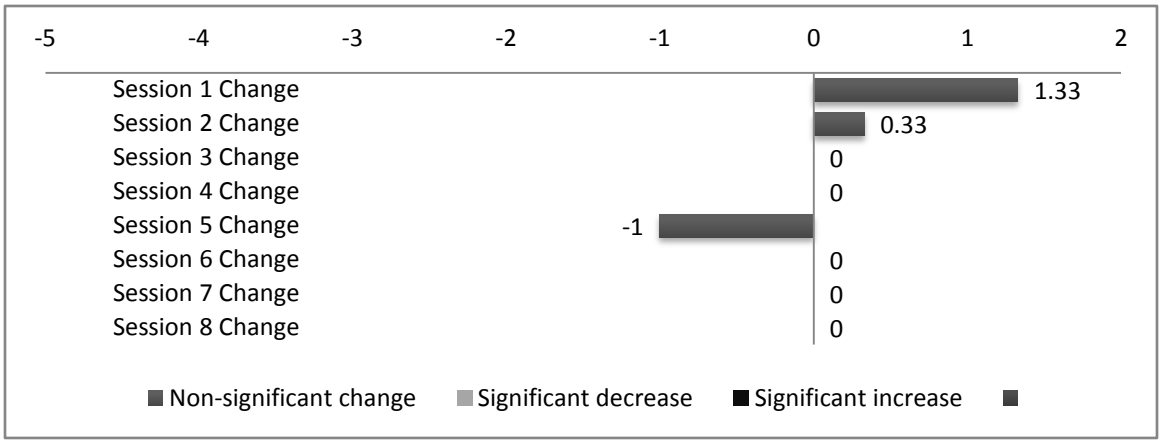

Table 5: Changes in Lori's reading span from pre- to post-session

In the case of the reading span, it is difficult to draw any generalizations, given that no pre- to post-session shifts were significant. It is interesting that the Session 1 positive shift coincided with a positive shift in attitudes and motivations. Unfortunately, this pattern did not hold in Session 8, which saw the same positive shift in attitudes and motivation.

4.2.4 Summary

The only recast that showed evidence of acquisition across sessions was Roberto's suggestion that Lori should address him using the familiar *tú* rather than the

formal *usted*. This result might indicate that pragmatic recasts are much more salient than those that involve grammatical or even lexical form. It is possible that this salience may have dulled Lori's motivation and attitudes towards learning Spanish. The other items that stood out were Lori's excuses for her poor Spanish, which were absent from the sessions that exhibited positive AMTB shifts, even despite the extensive use of codeswitching in Session 1. Could it be that those activities that lead second language learners to 'notice the gap' or 'restructure' their interlanguage, generally positively cast in SLA literature (cf. Lightbown, Spada & Wallace 1980), may have negative consequences in those factors that actually regulate the attentional resources devoted to such restructuring?

Also, it appears as though thus far, the informal proficiency rankings given by the moderators/interlocutors at the end of each session (unbeknownst to the participants) possibly correlate with positive AMTB shifts. If this pattern holds across participants, it might lend validity to more emic measures of proficiency. This, of course, would speak to Lave & Wenger (1991), who would argue that the community of practice (or a representative thereof) *is* the legitimate determiner of 'proficiency'. Moreover, it is possible that this determination is somehow pragmatically or contextually conveyed in such a way that it reflects in a participant's attitudes and motivational profile. Of course, this is pure speculation at present, but bears further consideration moving forward.

The shifts in personality are somewhat more difficult to relate to the interaction. The troubled topic nominations in Session 3 might explain the apparent lack of 'positive' shift in Lori's extroversion, but Sessions 4 and 7, which did exhibit significant shifts,

showed no remarkable markers of extroversion, such as substantially-longer, more numerous entries, more successful topic nominations, or particularly unique topics of conversation. Possible explanations might include the lack of true contrast in that there were no 'negative' shifts in personality that attained a level of significance, as well as the possibility that the predictors of increased extroversion in Lori's case are too complex to identify, given the nature of the data.

Overall, Lori's data would support Hypotheses 2 and 3.

4.3 SANDRA

At the time of the study, Sandra was a 20 year-old female. She was currently enrolled in a second-semester Spanish course at St. Edward's university and had previously studied Spanish for 2 semesters. S/he was a NS of English and spoke no other languages at home.

4.3.1 Attitudes and Motivation

Sandra showed the second-lowest degree of unpredictability in pre- to post-session shifts in her attitudes and motivation, with a standard of deviation of 0.3806 (see Table 6 below). Only Kathy's AMTB shifts displayed a lower standard of deviation, but she dropped out of the experiment after four sessions, making any global comparisons between her and other participants impossible. Like Lori, and indeed like 75% of the participants, Sandra's average pre- to post-session attitude/motivation was positive (roughly .5 points on the 7-point Likert scale used to measure attitudes and motivation), meaning that she either gained motivation to study Spanish, her attitudes towards

learning Spanish became more favorable, and/or her desire to learn Spanish became greater. In fact, Sandra's shift was on the higher end of the spectrum; only Jessica, Erin and Sally had higher average positive shifts.

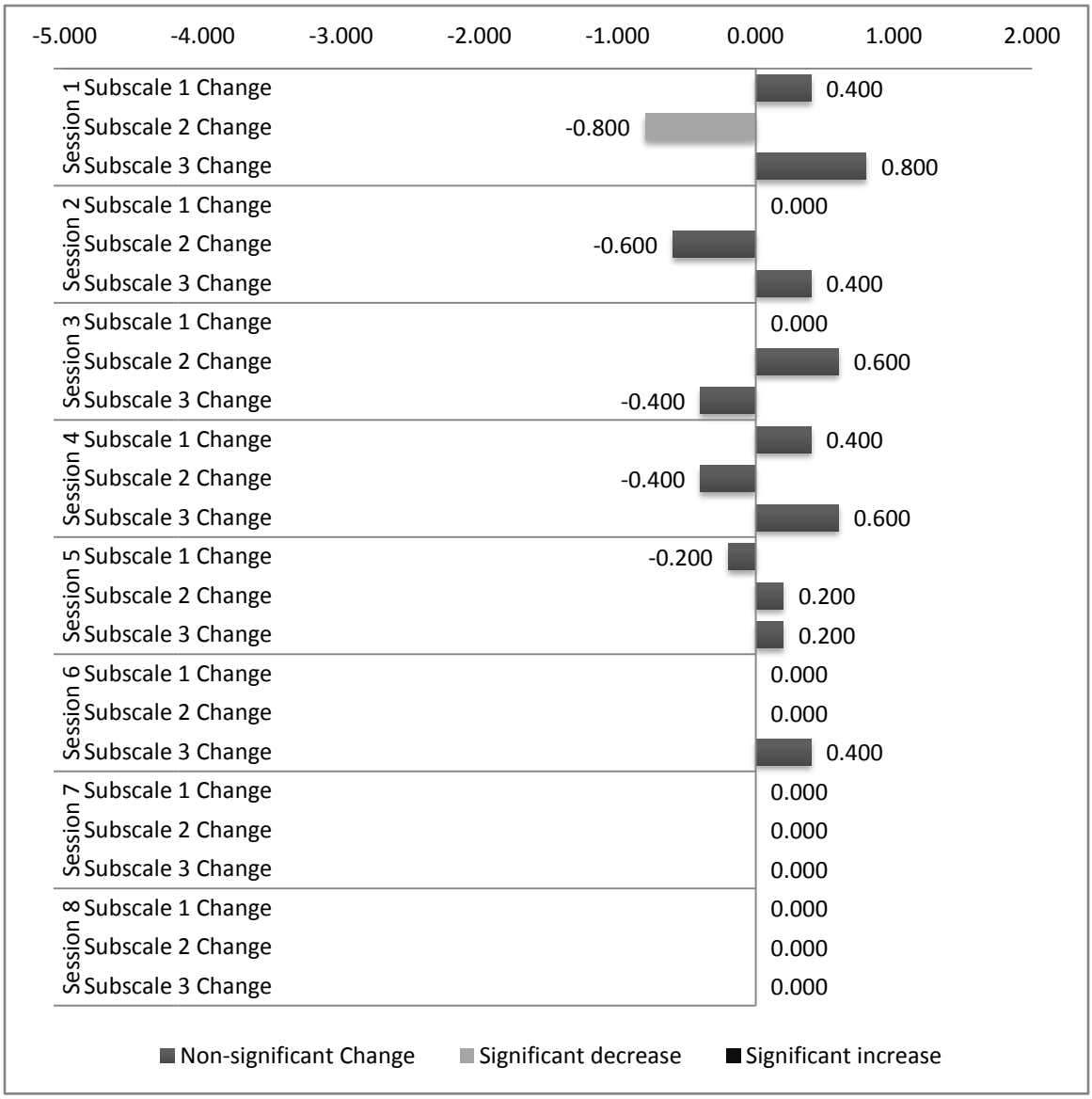

Table 6: Changes in Sandra's AMTB items from pre- to post-session

Despite showing a higher average positive shift with a lower standard deviation than Lori, it is more difficult to characterize this treatment as an overall positively-motivating experience for Sandra. The fact that there was one significant negative shift in Subscale 2 (=desire to learn Spanish) during Session 1 (highlighted in Table 6 above) and no significant positive shifts in attitudes and motivation would temper the overall positive trends.

Again, the lack of both significant positive *and* negative shifts in the same subscale would necessitate comparing Session 1 with Session 3. Despite the shift in Session 3, Subscale 2 not achieving a level of significance ($p = 0.1746$), it does represent the greatest positive shift, and it is significantly different from Session 1, Subscale 2 ($p = 0.008$). The same reservations previously mentioned would apply to this comparison as well.

4.3.1.1 Session 1

Session 1 consisted of 399 words and 85 entries, 34 entries by Sandra and 51 entries by Emilia, the NS interlocutor. The majority of the session was disjointed, apparently due in part to Sandra's low proficiency and Emilia's use of complex forms, as illustrated in Exchange 9 below.

Exchange 9:

(1) 10:06 AM Emilia: puedes decir: no te entendi o
(2) 10:07 AM Emilia: no entiendo
(3) 10:07 AM Emilia: o no comprendi
(4) 10:07 AM Emilia: o no comprendo
(5) 10:07 AM Sandra: ok....no comprendi espanol
(6) 10:07 AM Sandra: :)
(7) 10:08 AM Emilia: que te parece, dificil?
(8) 10:08 AM Sandra: si

(9) 10:08 AM Sandra: come si dice...my teacher makes it a little easier for me
(10) 10:08 AM Emilia: mientras mas practiques mas aprenderas.
(11) 10:09 AM Emilia: mi profesor lo hace mas facil
(12) 10:09 AM Sandra: ok..mi profesor lo hace mas facil.
(13) 10:10 AM Emilia: es muy sencillo, ya lo veras. Poco a poco.
(14) 10:10 AM Sandra: come se dice?
(15) 10:10 AM Emilia: trata de escribir todo en espanol.

(1) 10:06 AM Emilia: 'you can say I did not understand or'
(2) 10:07 AM Emilia: 'I don't understand'
(3) 10:07 AM Emilia: 'or I didn't understand'
(4) 10:07 AM Emilia: 'or I don't understand'
(5) 10:07 AM Sandra: 'ok....I didn't understand Spanish'
(6) 10:07 AM Sandra: :)
(7) 10:08 AM Emilia: 'what seems difficult to you?'
(8) 10:08 AM Sandra: 'yes'
(9) 10:08 AM Sandra: 'how [do you] say'...my teacher makes it a little easier for me
(10) 10:08 AM Emilia: 'the more you practice, the more you will learn.'
(11) 10:09 AM Emilia: 'my professor makes it easier'
(12) 10:09 AM Sandra: ok.. 'my professor makes it easier'.
(13) 10:10 AM Emilia: 'It's very easy, you'll see. Little by little.'
(14) 10:10 AM Sandra: 'how do you say [that in English]?'
(15) 10:10 AM Emilia: 'try to write everything in Spanish.'

This was Emilia's first session, and her expectation of Sandra's level of proficiency was inaccurate, as she admitted to me in a telephone conversation later that day. This, coupled with Emilia's lack of experience in a Spanish teacher role protracted the initial adjustment. Clearly, in Exchange 9, the use of idiomatic expressions (i.e. *poco a poco* 'little by little'), reverse psych verbs (e.g. *te parece* 'does it seem to you') as well as future, preterit, subjunctive and imperative verbal inflections were beyond Sandra's ability. She was not aware of the temporal/aspectual difference, for example, in *comprendo* (1SG.PRES) vs. *comprendí* (1SG.PST.PERF) and chose the incorrect form for her self-correction on Line 5. Moreover, Sandra gave an incongruent answer to

Emilia's question in Line 7, and her clarification request in Line 14 was apparently not understood by Emilia, both of which indicate a mismatch between Emilia's expectations and Sandra's ability.

4.3.1.1.1 Language-related episodes

Very few sequences in Session 1 were without LREs. Recall that Sandra made 34 total entries; 10 of those were clarification requests, and 2 were translation requests. Additionally, there was one negotiation of meaning that centered on the verb *tratar* 'to try'. It lasted roughly six minutes, but finally ended successfully (see Exchange 10 below).

Exchange 10:

(1) 10:10 AM Emilia:trata de escribir todo en espanol.
(2) 10:11 AM Sandra: como se dice trata?
(3) 10:11 AM Emilia:no importa que. Yo tratare de entender.
(4) 10:11 AM Sandra: no comprendo
(5) 10:11 AM Emilia:ejemplos:
(6) 10:12 AM Emilia: (Sandra), trata lo mejor que puedas.
(7) 10:12 AM Emilia:o
(8) 10:13 AM Emilia:Yo tratare de aprender espanol.
(9) 10:14 AM Sandra: ??
(10) 10:14 AM Emilia:Bien. Aqui va otro ejemplo en espanol que lo usan
(11) mucho en ingles
(12) 10:15 AM Sandra: ok
(13) 10:15 AM Emilia:Tratare lo mejor.
(14) 10:16 AM Sandra: is it try your best?
(15) 10:16 AM Emilia:Bueno, no importa. Quizas en la proxima sesion sabras
(16) el significado de la palabra
(17) 10:16 AM Emilia:SIIIIIIIIIIIIIIIIIII!!!!!!!!!!
(18) 10:16 AM Emilia:Bien hecho!!!!!

(1) 10:10 AM Emilia: 'try to write everything in Spanish.'
(2) 10:11 AM Sandra: 'how do you say *trata*?'
(3) 10:11 AM Emilia: 'it doesn't matter what. I'll try to understand.'
(4) 10:11 AM Sandra: 'I don't understand'

(5) 10:11 AM Emilia: ‘examples:’
(6) 10:12 AM Emilia: ‘(Sandra), try your best.’
(7) 10:12 AM Emilia: ‘oh’
(8) 10:13 AM Emilia: ‘I will try to learn Spanish.’
(9) 10:14 AM Sandra: ??
(10) 10:14 AM Emilia: ‘Good. Here is another example in Spanish which is used’
(11) ‘a lot in English’
(12) 10:15 AM Sandra: ok
(13) 10:15 AM Emilia: ‘I’ll try my best.’
(14) 10:16 AM Sandra: is it try your best?
(15) 10:16 AM Emilia: ‘Well, it doesn’t matter. Maybe in the next session you’ll know’
(16) ‘the meaning of the word’
(17) 10:16 AM Emilia: ‘YEEEEEEEEEEEES!!!!!!!!!!’
(18) 10:16 AM Emilia: ‘Well done!!!!!’

The extended length of this meaning negotiation made Emilia reluctant to engage in further negotiations. Both in this session and in subsequent sessions, Emilia avoided negotiations, as illustrated in Exchange 11 below.

Exchange 11:
(1) 10:26 AM Emilia: Sabes lo que es comida?
(2) 10:27 AM Sandra: que?
(3) 10:27 AM Emilia: No importa.
(4) 10:28 AM Emilia: Bueno (Sandra) fue un placer hablar contigo.

(1) 10:26 AM Emilia: ‘Do you know what food is?’
(2) 10:27 AM Sandra: ‘what?’
(3) 10:27 AM Emilia: ‘It doesn’t matter.’
(4) 10:28 AM Emilia: ‘Well (Sandra) it was a pleasure to speak with you.’

4.3.1.1.2 Conversation management & pragmatic markers

Due to the fact that much of the written interaction was given to LREs, only three topics were nominated, all of them by Emilia. Additionally, Emilia produced two sets of

three *ja*'s and Sandra produced one emoticon. All of these appeared to be markers of solidarity.

4.3.1.1.3 Metacognition

Sandra's recorded think-aloud data are quite scarce. She uttered only five intelligible sentences during the entire session. The longest sequence occurred 11 minutes into the interaction and is transcribed in Exchange 12 below.

Exchange 12:

(1) 10:11 AM Sandra: no comprendo
(2) 10:11 AM Emilia: ejemplos:
(3) Think aloud[10]: (she uses) really difficult words (and I don't understand
(4) them) (.) I guess (she is going to explain)
(5) 10:12 AM Emilia: (Sandra), trata lo mejor que puedas.
(6) Think aloud: I (want to) try to understand but I can't ( ) I'm not going to
(7) ( ) (.) (I really am having trouble)

(1) 10:11 AM Sandra: 'I don't understand'
(2) 10:11 AM Emilia: 'examples:'
(3) Think aloud[11]: (she uses) really difficult words (and I don't understand
(4) them) (.) I guess (she is going to explain)
(5) 10:12 AM Emilia: '(Sandra), try to do your best.'
(6) Think aloud: I (want to) try to understand but I can't ( ) I'm not going to
(7) ( ) (.) (I really am having trouble)

These, like the other think-aloud data, are largely centered on monitoring the discourse and they echo the above exchange in the sense that they indicate a lack of comprehension. There were no pauses that lasted greater than one minute, but the fact

[10] The lines that begin with 'Think aloud' represent the recorded data from the think-aloud protocol that happened simultaneously with the text chats. Recall that the NS interlocutor was unable to hear these comments.

[11] The lines that begin with 'Think aloud' represent the recorded data from the think-aloud protocol that happened simultaneously with the text chats. Recall that the NS interlocutor was unable to hear these comments.

that Emilia's entries outnumbered Sandra's by a ratio of 1.5:1, coupled with the imbalance in TCU length, effectively indicate that Emilia was carrying the entire conversation. Emilia's proficiency ranking of Sandra was 1 on a 10-point Likert scale.

4.3.1.2 Session 3

Session 3 is cautiously used as a counterpoint to Session 1 as it represented the greatest positive shift in Subscale 2 of the AMTB items. Even though the shift is not significant in and of itself, it is significantly different from the negative shift seen in Session 1. It contained 570 words, with 38 entries by Sandra and 41 entries by Emilia. It was decidedly less turbulent than Session 1 in that it contained fewer LREs and more coherent sequences as illustrated in Exchange 13.

Exchange 13:

(1) 10:32 AM Emilia: Hola (Sandra), como estas?
(2) 10:32 AM Sandra: muy cansado
(3) 10:32 AM Emilia: Yo tambien. Por que estas cansada?
(4) 10:33 AM Sandra: yo tengo el examin
(5) 10:33 AM Sandra: lo es muy dificil
(6) 10:33 AM Sandra: y tu?

(1) 10:32 AM Emilia: 'Hi (Sandra), how are you?'
(2) 10:32 AM Sandra: 'very tired (MASC)'
(3) 10:32 AM Emilia: 'Me too. Why are you tired (FEM)?' ((recast))
(4) 10:33 AM Sandra: 'I have the test'
(5) 10:33 AM Sandra: 'it is very difficult'
(6) 10:33 AM Sandra: 'and you?'

For the first time, Sandra was able to hold the floor for three TCUs and even initiated an exchange in the last line. Moreover, the recast in Line 3 either went unnoticed or at least did not disrupt the flow of the interaction. Moreover, Sandra's non-

standard usage of the dative clitic *lo*, apparently did not impair the interaction and went unremarked by Emilia.

4.3.1.2.1 Language-related episodes

Session 3 had one recast (shown above) and three translation requests, usually preceded by *como se dice*... 'how do you say…'. Additionally, there was one meaning negotiation (see Exchange 14 below).

Exchange 14:

(1) 10:37 AM Emilia: Tienes mascotas?
(2) 10:38 AM Sandra: I don't know what that means
(3) 10:38 AM Sandra: lo siento
(4) 10:39 AM Emilia: Tienes un gato o un perro?
(5) 10:39 AM Sandra: si, un gato.

(1) 10:37 AM Emilia: 'Do you have pets?'
(2) 10:38 AM Sandra: I don't know what that means
(3) 10:38 AM Sandra: 'I'm sorry'
(4) 10:39 AM Emilia: 'Do you have a cat or a dog?'
(5) 10:39 AM Sandra: 'yes, a cat.'

Here again, rather than engage in a complex meaning negotiation, Emilia opts instead to rephrase the question using more basic lexical items. The net result, in contrast to Session 1, is a shorter LRE that minimally interrupts the conversational flow.

4.3.1.2.2 Conversation management & pragmatic markers

It appears that by Session 3, Emilia has adjusted to using more simplified speech. She still nominated each of the 5 topics discussed. They involved pastimes, the weather

in Texas, Spanish class, the recent weekend and visiting family. As in Exchange 14 above; however, Sandra was far more engaged and able to communicate on those topics. She produced two happy emoticons, and two sets of two *ha*'s. The *ha*'s were used in conjunction with *sí* 'yes' as an intensifier, while the emoticons were apparently used to indicate solidarity. Emilia produced three sets of three *ja*'s, all of which were apparent markers of solidarity.

4.3.1.2.3 Metacognition

Unlike Session 1, Sandra was silent during Session 3, the exact reason for which is not known. In previous sessions, Sandra's think-aloud comments centered on miscomprehensions, the only exception being her final comment towards the end of Session 2, in which she stated, "this chat has been a lot better than the last one." This was the last comment she made during the entire study. There was a single pause that lasted over one minute in Session 3, which occurred when Sandra had the floor. Other than that, there were no other markers of metacognition. Emilia's ranking of Sandra's proficiency jumped from 4 in Session 2 to 5 in Session 3.

4.3.2 Personality

Session 5 marked a turning point in the quality of Sandra's interactions. Her TCUs became longer and more complex, LREs virtually disappeared and the topics of discussion became more varied. The sudden change was clearly the result of Sandra's insistence on using online dictionaries and translation tools (see Exchange 15 below) despite repeated instruction not to do so. She cited being tired of feeling 'stupid' during the sessions and wanting to express herself more freely as reasons for repeatedly

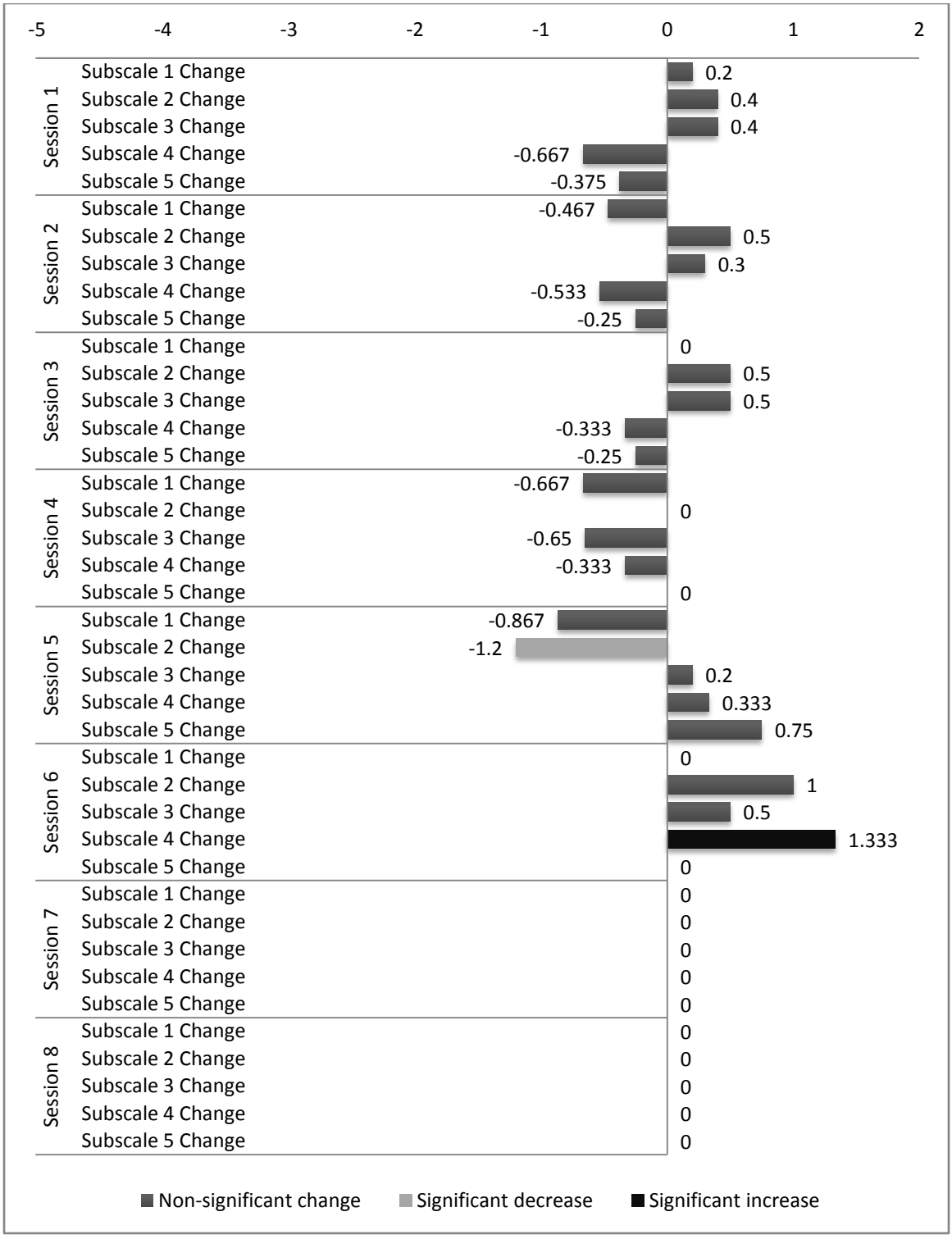

Table 7: Changes in Sandra's BFI items from pre- to post-session

resorting to the use of online tools. Recall that more frequent interactive LREs appeared to impact both Lori's and Sandra's attitudes and motivation negatively. Interestingly, Sandra's frequent *non*-interactive LREs (i.e. her use of online tools) had no such impact in Sessions 5 through 8. Moreover, after Session 5, there were no further negative shifts in either Personality or Motivation; in fact, both appeared to stabilize by the end of the treatment.

Table 7 above illustrates some change in Sandra's personality profile beginning in Session 5, more specifically a downward shift in Subscale 2 (=conscientiousness) from pre- to post-Session 5, and then an upward shift in the Subscale 4 (=agreeableness) from pre- to post-Session 6. These are the only shifts that were statistically significant.

There are four indicators of non-interactional LREs. The first is the use of orthographic accents, as in *único* on Line 10, as opposed to the lack of obligatory orthographic accents as on the word *sí* on Lines 4 and 6 and *también* on Line 11. It is likely that Lines 4, 6 and 11 were produced without recourse to online tools, unlike Line 10. The second indicator are words that were mistranslated, possibly due to common English orthographic errors (e.g. *its* = *su*, but *it's* = *está* as in Lines 2 and 10). The third indicator is low-frequency words, especially those that are likely erroneously selected due to English polysemy (e.g. the use of *aunque* instead of *sin embargo* to translate 'though'). The final indicator comes from the data picked up by Sandra's microphone during the session. Lines 2 and 10 were the result of many audible keystrokes followed by a pause of over 15 seconds, then one or two clicks/keystrokes before the text appeared. These are congruent with the tasks involved in using an online translator. These 'non-interactional LREs' were not perceived as a threat to the study because (1) the overarching approach

behind the study is to cope with rather than strictly control learners' impulses, (2) Sandra admitted to using online tools and gave a fair rationale, and (3) 'non-interactional' LREs can be identified using the indicators stated above.

4.3.2.1.1 Language-related episodes

There was one recast given in Session 5 (see Exchange 15 above) and one negotiation of the meaning of the word *Suiza* 'Switzerland' that lasted approximately 12 TCUs (see Exchange 16 below).

Exchange 16:

(1) 11:35 AM Emilia: viene una tia de Suiza a visitarme por un mes y medio y
(2) luego visitare a mi familia en florida
(3) 11:36 AM Sandra: Suiza?
(4) 11:36 AM Emilia: si Ginebra-Suiza
(5) 11:37 AM Emilia: sabes quien es Roger Federer?
(6) 11:37 AM Sandra: ??
(7) 11:37 AM Emilia: ok
(8) 11:38 AM Emilia: hmmm
(9) 11:38 AM Sandra: él es un jugador de tenis o de golf?
(10) 11:38 AM Emilia: el #1 en tenis
(11) 11:38 AM Emilia: el es Suizo
(12) 11:38 AM Emilia : Switzerland
(13) 11:38 AM Sandra: ohhh ok
(14) 11:38 AM Emilia : ja,ja esta bien
(15) 11:39 AM Sandra: jaja

(1) 11:35 AM Emilia: 'an aunt from Switzerland is coming to visit me for a month and a half and'
(2) 'then I'll visit my family in Florida'
(3) 11:36 AM Sandra: 'Switzerland?'
(4) 11:36 AM Emilia: 'yes Geneva-Switzerland'.
(5) 11:37 AM Emilia: 'do you know who Roger Federer is?'
(6) 11:37 AM Sandra: ??
(7) 11:37 AM Emilia: ok
(8) 11:38 AM Emilia: hmmm
(9) 11:38 AM Sandra: 'he is a tennis or golf player?'
(10) 11:38 AM Emilia: '#1 in tennis'

(11) 11:38 AM Emilia: ‘he is Swiss’
(12) 11:38 AM Emilia : Switzerland
(13) 11:38 AM Sandra: ohhh ok
(14) 11:38 AM Emilia : ja,ja ‘it’s OK’
(15) 11:39 AM Sandra: jaja

This episode is quite complex as Emilia tries once again to resolve the breakdown entirely in Spanish, even though she generally avoids such opportunities. What starts out as a negotiation of the lexical item *Suiza* ‘Switzerland’ becomes a negotiation about Roger Federer, which Sandra tries to resolve by going online (=non-interactional LRE) in order to produce Line 9. After two more turns, Emilia abandons the negotiation by giving Sandra the English equivalent. It is interesting that, at this point, Sandra does not use online tools to resolve comprehension issues, only production issues. She might just as easily have looked up the word that was the source of the communication breakdown (i.e. *Suiza*). None of Sandra’s backchanneling (e.g. *ok*, or short responses, like *si*) were preceded by an inordinate number of keystrokes followed by a pause.

In all, there were 9 apparent non-interactional LREs, many of which resulted in awkward constructions that Emilia did not recast, as in Line 5 of Exchange 13.

4.3.2.1.2 Conversation management & pragmatic markers

Even though Emilia nominated each of the session’s 4 topics, Sandra’s use of online tools allowed her to execute longer, more complex TCUs and also to explore topics of mutual interest to her and Emilia. They discovered that they were both studying psychology and both intended to pursue future careers in the field. There were no LREs in this episode and Emilia closed by wondering if one day they might be colleagues, thus putting herself on equal footing with Sandra. This elicited laughter of solidarity from

both, which, when combined with the laughter in Exchange 16 above, make a total of 5 *ja*'s for Emilia and 4 *ja*'s for Sandra. Sandra did not use the English *ha* at all in contrast to previous sessions.

4.3.2.1.3 Metacognition

There were no markers of metacognition in this session and there were no pauses that lasted longer than one minute. Emilia's ranking of Sandra's proficiency jumped to 7 out of a possible 10 points.

4.3.2.2 Session 6

Session 6 contrasted with Session 5 because, whereas Session 5 saw a significant downward shift in Subscale 2 pre- to post-session ($p = 0.0186$), Session 6 elicited a significant upward shift in Subscale 4 ($p = 0.0104$), as well as an upward shift in Subscale 2 that approached significance ($p = 0.0506$). Moreover, the difference in Subscale 2 between Sessions 5 and 6 was significant ($p = 0.0015$) and the difference in Subscale 4 between Sessions 5 and 6 approached significance ($p = 0.0792$). Session 6 lasted a relatively short 19 minutes and contained 254 words, with 11 entries by Sandra and 20 entries by Emilia, the interlocutor.

4.3.2.2.1 Language-related episodes

There was one recast and one abandoned turn, both of which are shown in Exchange 17 below. Other than that, Sandra persisted in her use of online tools for her

more complex TCUs, relying on her own abilities primarily for backchanneling and short responses, as in Session 5. In all there were 6 identifiable non-interactional LREs.

4.3.2.2.2 Conversation management & pragmatic markers

Again, Emilia nominated each of the two topics discussed during this session. The first topic made this interaction unique in that it contained an apology and a request by Emilia, which were precipitated by the fact that Emilia was late to the session and had to end it sooner than expected (see Exchange 17 below).

Exchange 17:

(1) 12:01 PM Emilia: recibiste mi e-mail esta manana?
(2) 12:02 PM Sandra: si
(3) 12:02 PM Emilia: oh, llegaste temprano, cierto?
(4) 12:02 PM Sandra: si, Me subí alrededor de las 11:30
(5) 12:03 PM Emilia: hmm, es mejor decir: entre en sesion alrededor de...
(6) 12:03 PM Emilia: cuanto lo siento. Pense que no habias recibido mi
(7) mensaje.
(8) 12:04 PM Emilia: Lo siento mucho, que pena contigo
(9) 12:04 PM Sandra: puedes
(10) 12:05 PM Emilia: me preguntabas?
(11) 12:05 PM Sandra: que?
(12) 12:06 PM Emilia: no, nada. Te parece si terminamos la sesion 10 minutos
(13) antes?
(14) 12:06 PM Sandra: esta bien
(15) 12:07 PM Emilia: Mil gracias! La proxima semana podriamos recuperar
(16) esos 10 minutos, que te parece?
(17) 12:07 PM Sandra: puede que trabaja para mí
(18) 12:08 PM Emilia: bien tu me dejas saber
(19) 12:08 PM Emilia: de acuerdo?

(1) 12:01 PM Emilia: 'did you get my email this morning?'
(2) 12:02 PM Sandra: 'yes'
(3) 12:02 PM Emilia: 'oh, you got here early, didn't you'
(4) 12:02 PM Sandra: 'yes, I got up around 11:30'
(5) 12:03 PM Emilia: 'hmm, it's better to say: I entered the session around…' ((recast))
(6) 12:03 PM Emilia: 'I'm so sorry. I thought that you hadn't received my'

(7) ‘message’.
(8) 12:04 PM Emilia: ‘I’m very sorry, I feel so bad’
(9) 12:04 PM Sandra: ‘can you’
(10) 12:05 PM Emilia: ‘you were asking me?’
(11) 12:05 PM Sandra: ‘what?’
(12) 12:06 PM Emilia: ‘no, nothing. Is it OK with you if we end the session 10 minutes’
(13) ‘early?’
(14) 12:06 PM Sandra: ‘it’s fine’
(15) 12:07 PM Emilia: ‘Many thanks! Next week we’d be able to recoup’
(16) ‘those 10 minutes, what do you think?’
(17) 12:07 PM Sandra: ‘maybe it can work for me’
(18) 12:08 PM Emilia: ‘good you’ll let me know’
(19) 12:08 PM Emilia: ‘agreed?’

It is worth noting that this exchange lasted nearly half of the entire session. Moreover, Sandra was accommodating to Emilia’s request and did not express any discontent at having to wait to begin the session. Indeed, Sandra’s responses may be directly linked to her self-perception as being agreeable towards Emilia’s request (=Personality Subscale 2) and more conscientious for having logged on at the agreed upon time (=Personality Subscale 4). The pragmatic events of apologizing and issuing requests, in that they occur so rarely in these interactions, may have been momentous enough to trigger such a shift.

There were no *ja*/*ha*’s or other overt markers of solidarity.

4.3.2.2.3 Metacognition

Again, there were no metacognitive markers in this session. On one occasion, Sandra entered “uhhhh *un poco*” ‘uhhh a little’ (12:59) in response to a question as to whether she had traveled much within the United States. While the *uhhhh* would ordinarily be indicative of a planning episode, since it did not straddle two entries in an

attempt to hold the floor, it may also have been used as a mitigator for the 49-second pause that occurred between the question and the response. The final proficiency evaluation by Emilia was 5 out of a possible 10 points.

4.3.3 Reading Span

As shown in Table 8 below, there were no pre- to post-session reading span shifts that were significant. Therefore, no comparisons can be drawn in this case.

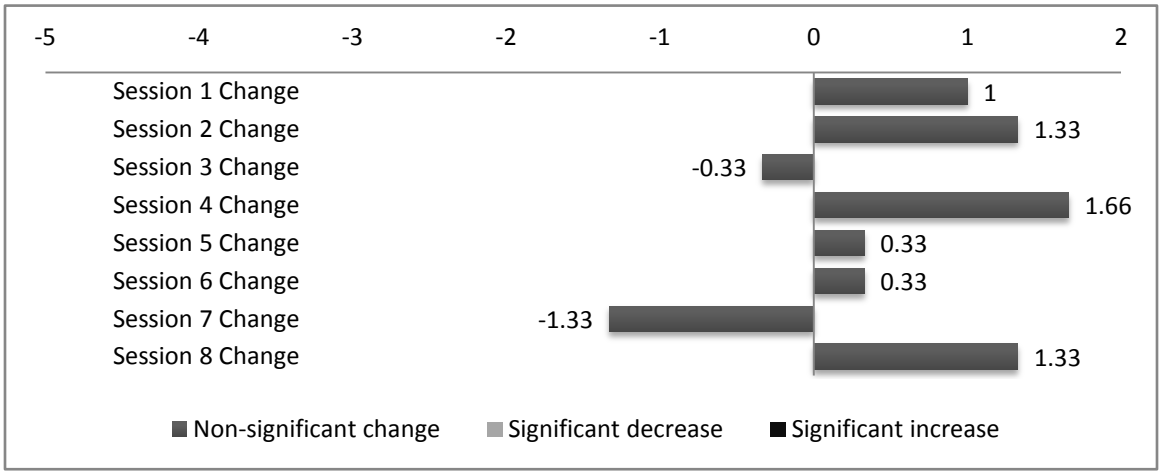

Table 8: Changes in Sandra's Reading Span from pre- to post-session

4.3.4 Summary

Recall that in Lori's case, a relative absence of LREs coincided with positive pre- to post-session AMTB shifts. In Sandra's case, the converse is true; that is, the session with the most interactional LRE's, indeed the session with nearly constant LREs, was the

one session that showed a substantial negative pre- to post-session shift in AMTB items. This finding would support a tentative hypothesis that interactional LREs, especially those that are particularly protracted, negatively correlate with short-term shifts in motivation and attitudes.

I would argue that the principle difference between interactional and non-interactional LREs is not the motivation behind them, nor the attention to form, or noticing a gap in the interlanguage, etc. The principle difference between the two could be that interactional LREs come loaded with pragmatic implications, such as the reaffirmation of the expert-novice relationship, whereas non-interactional LREs do not. Perhaps the salience of such pragmatic weight renders interactional LREs more salient and therefore more conducive to learning from a psycholinguistic/structuralist standpoint, but also more demotivating from an ID standpoint. Which of the two has a better net effect on second language acquisition, though an intriguing question, is beyond the scope of this dissertation.

Unlike Lori's case, a possible link between the discourse and pre- to post-session personality shifts was discovered. In Session 5, reliance on online translation tools led to a substantial leap in Emilia's proficiency rating, but a substantial downshift in Sandra's conscientiousness (=Subscale 2). She could have felt some cognitive dissonance that her new strategy was in direct conflict with the instructions she was given at the beginning of each session, which clearly stated that participants were "not to use any dictionary or other aids". Perhaps this dissonance may have been resolved when she later justified her choice to me.

Even more probable is the impact that Emilia's apology and request (the only ones in the entire treatment) had on her conscientiousness (=Subscale 2) and agreeableness (=Subscale 4), both due to their novelty and because of their empowering

nature that contradicts the more typical expert-novice relationship perpetuated by this treatment.

4.4 SALLY

At the time of the study, Sally was an 18 year-old female. She was currently enrolled in a second-semester Spanish course at St. Edward's university and had previously studied Spanish for 1 semester. She was a NS of English and spoke no other languages at home.

4.4.1Attitudes and Motivation

Of the 8 participants in this study, Sally exhibited the greatest average positive pre- to post-session shift: over 0.14, which corresponds to nearly one full point on the 7-point Likert scale used to measure AMTB items. Her standard deviation (0.647347), and therefore the predictability of her pre- to post-session shifts, was only slightly above average when compared with the other participants in the study. Erin, John and Lori all had higher standard deviations and, therefore, lower rates of predictability.

Any claims that Sally's attitudes and motivation benefitted from this treatment would be tempered by the fact that the only significant pre- to post-session shift was negative(-1.2, $p = 0.0496$). It occurred in Subscale 2 (Desire to learn Spanish) during Session 7 (see Table 9 below). Once again, there are no significant positive shifts with which to contrast the significant negative shift seen in Session 7. The greatest positive shift (1.2, $p = 0.1157$) occurred in Subscale 2 during Session 8. The difference between the greatest positive and negative shifts approaches significance ($p = 0.0827$), meaning

that there is nearly a 92% certainty that the difference between the two points is real and not attributable to a measurement error. The two sessions in which these shifts occurred are therefore tentatively compared to one another.

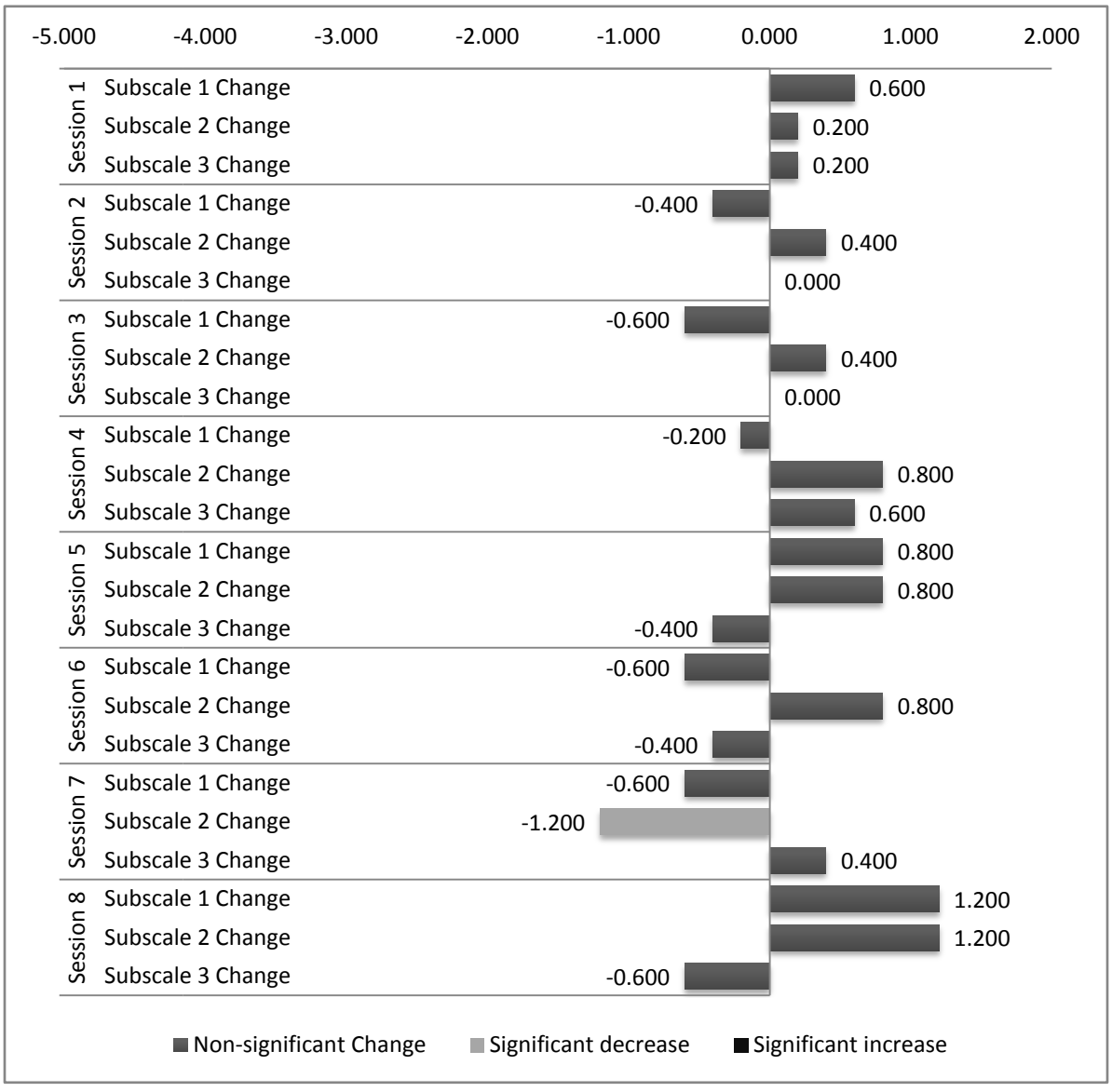

Table 9: Changes in Sally's AMTB items from pre- to post-session

4.4.1.1 Session 7

Session 7 lasted 31 minutes and contained 401 words. There was a total of 102 entries, 48 by Sally and 54 by Roberto, the interlocutor. It represents the only session that exhibited a significant (negative) pre- to post-session shift in an AMTB subscale.

4.4.1.1.1Language-related episodes

Session 7 stood out because *every* exchange within it involved an LRE, some of which lasted several minutes, as in Exchange 18 below.

Exchange 18:

(1) 5:44 PM Roberto: Y tu? Como estas?
(2) 5:45 PM Sally: bien. estoy preoccupada. preoccupada = busy?
(3) 5:45 PM Sally: tengo muchas cosas que hacer. jaja
(4) 5:46 PM Roberto: no, preocupada es cuando tienes miedo que algo malo
(5) vaya a pasar
(6) 5:46 PM Sally: ooh, yo comprendo.
(7) 5:46 PM Roberto: "ayer llegue a casa muy tarde, y mi mama estaba muy
(8) preocupada por mi"
(9) 5:47 PM Roberto: ^es un ejemplo de preocupado
(10) 5:47 PM Roberto: comprendes?
(11) 5:48 PM Sally: si. comprendo.
(12) 5:48 PM Roberto: en ingles?
(13) 5:48 PM Sally: que en ingles?
(14) 5:48 PM Roberto: si
(15) 5:48 PM Roberto: preocupado
(16) 5:48 PM Sally: worried
(17) 5:48 PM Sally: ?
(18) 5:48 PM Roberto: ☺
(19) 5:49 PM Roberto: si!
(20) 5:49 PM Sally: ☺
(21) 5:49 PM Roberto: ahora, pienso que tu estas ocupada
(22) 5:49 PM Roberto: ocupada es cuando tienes mucho que hacer
(23) 5:49 PM Sally: ohh, si. yo estoy ocupada.

(1) 5:44 PM Roberto: ‘And you? How are you?’
(2) 5:45 PM Sally: ‘well. I am worried’ *preoccupada* = busy?
(3) 5:45 PM Sally: ‘I have lots of things to do’. jaja
(4) 5:46 PM Roberto: ‘no, *preocupada* is when you are afraid that something bad’
(5) ‘will happen’
(6) 5:46 PM Sally: ooh, ‘I understand’.
(7) 5:46 PM Roberto: ‘"yesterday I got home very late and my mother was very’
(8) ‘worried about me”’
(9) 5:47 PM Roberto: ^ ‘is an example of *preocupado.’*
(10) 5:47 PM Roberto: ‘do you understand?’
(11) 5:48 PM Sally: ‘yes. I undersand’.
(12) 5:48 PM Roberto: ‘in English?’
(13) 5:48 PM Sally: ‘what in English?’
(14) 5:48 PM Roberto: ‘yes’
(15) 5:48 PM Roberto: *preocupado*
(16) 5:48 PM Sally: worried
(17) 5:48 PM Sally: ?
(18) 5:48 PM Roberto: ☺
(19) 5:49 PM Roberto: ‘yes!’
(20) 5:49 PM Sally: ☺
(21) 5:49 PM Roberto: ‘now, I think that you are busy’
(22) 5:49 PM Roberto: ‘*ocupada* is when you have a lot to do’
(23) 5:49 PM Sally: ohh, ‘yes, I am busy.’

In all, there were 11 meaning negotiations, two recasts and one translation request. This was Sally’s first session with Roberto, and it demonstrated a remarkable jump in the number of LREs. The previous session with Emilia, for example, contained 6 meaning negotiations; one translation request and one clarification request. This number was roughly half of the LREs contained within Session 7. Session 8 (analyzed below), also included roughly half of the LREs of Session 7, with 6 meaning negotiations and one translation request.

4.4.1.1.2 Conversation management & pragmatic markers

Sally did not nominate any topics during Session 7. She produced 6 pairs of *ja*'s and one set of three successive *ja*'s, all of which appeared to be markers of solidarity. Roberto did not indicate any laughter. The following section presents evidence suggesting that these *ja*'s are indeed markers of solidarity.

4.4.1.1.3 Metacognition

In contrast to Lori and Sandra, Sally provided quite a bit of intelligible think-aloud data. The vast majority of her (roughly 12) comments were markers of active monitoring coupled with self-evaluation and they varied among three themes: "I'm not sure what he's asking" (5:48), "I'm feeling confused" (5:48), and "I keep yawning (.) very distracted" (6:03). Only one of these comments was positive: "I feel a little better" (5:49). The positive comment was made after the LRE shown in Exchange 9 above was resolved.

One of Sally's comments was a marker of planning: "(I'm) trying to think of something to say (.) I don't know what to talk about" (5:59). This comment shows an emergent motivation to nominate a topic, which would not materialize in this session. Additionally, there were two evaluative comments: "It's kinda cool how he makes words into other words so I don't feel completely stupid" (5:58) and "I can't believe I don't know how to say I'm sorry (.) I'll just laugh" (6:07). Of course, this final comment contains not only an evaluative but also a planning element that might provide insight into the complex use of laughter in Sally's case, and perhaps other language learners as well. It appears that this instance of laughter within the interaction is the result of Sally noticing a gap in her interlanguage and resorting to laughter as a (make-do) default marker of solidarity. None of the *ja*'s were accompanied by spontaneous laughter in the

recorded think-aloud data and there was usually a time lag between entries. These qualities give laughter a more calculated or premeditated texture than it might have in face-to-face interaction. Haakana (2001) saw the use of laughter to mitigate talk that would not have been expected of 'good' and 'reasonable' patients. Here, however, laughter is a 'default' pragmatic marker used as a proxy for an entire speech act. Whereas laughter is multi-functional for the native speaker, it appears even more so for the learner.

There was one pause that lasted longer than one minute, which occurred when Sally had the floor. The interlocutor's ranking of Sally's proficiency was 4 out of a possible 10 points.

4.4.1.2 Session 8

Session 8 contained 432 words and lasted 32 minutes. There was a 5-minute interruption in the middle of the session due to a faulty internet connection. A total of 110 entries were presented, 53 by Sally and 57 by Roberto, the interlocutor. Session 8 was used as a counterpoint to Session 7 because it demonstrated the greatest positive shift in AMTB Subscale 2. Although the shift did not achieve a level of significance ($p = 0.1157$), the difference between the shift in Session 7 and the shift in Session 8 did approach significance ($p = 0.0827$), which means that the two sessions are still highly likely to represent qualitatively different events, and are not merely errors in measurements.

4.4.1.2.1 Language-related episodes

While Session 8 also contained numerous LREs, there were several exchanges that did not, as illustrated in Exchange 19 below.

Exchange19:

(1) 11:49 AM Roberto: no tienes vacaciones de verano?
(2) 11:51 AM Sally: tengo uno semana antes escuela.
(3) 11:51 AM Sally: con no trabajo
(4) 11:51 AM Roberto: que pena - solo una semana?
(5) 11:51 AM Sally: si.
(6) 11:51 AM Roberto: que vas a hacer?
(7) 11:52 AM Sally: por vacaciones? o por trabajo?
(8) 11:52 AM Roberto: vacaciones
(9) 11:53 AM Roberto: el trabajo no es importante
(10) 11:53 AM Sally: jaja. por vacaciones, dormir.
(11) 11:53 AM Roberto: NOOOOOOOOOOOOOO!

(1) 11:49 AM Roberto: 'you don't have summer vacation?'
(2) 11:51 AM Sally: 'I have one week before school'
(3) 11:51 AM Sally: 'with no work'
(4) 11:51 AM Roberto: 'too bad – only one week?'
(5) 11:51 AM Sally: 'yes'.
(6) 11:51 AM Roberto: 'what are you going to do?'
(7) 11:52 AM Sally: 'for vacation? or for work?'
(8) 11:52 AM Roberto: 'vacation'
(9) 11:53 AM Roberto: 'work isn't important'
(10) 11:53 AM Sally: jaja. 'for vacation, sleep'.
(11) 11:53 AM Roberto: NOOOOOOOOOOOOOO!

Moreover, the longest LRE took roughly half the time to resolve than the longest LRE in Session 7 (4 minutes versus 2 minutes). It also spanned 17 TCUs, whereas the longest negotiation in Session 8 only spanned 8 TCUs (see Exchange 20 below).

Exchange 20:

(1) 11:40 AM Roberto: ay lo siento no se que pasa con mi conexion
(2) 11:40 AM Sally: ohh
(3) 11:40 AM Roberto: ojala no vuelva a pasar
(4) 11:40 AM Sally: no comprendo

(5) 11:41 AM Sally: ojala no vuelva?
(6) 11:41 AM Roberto: ojala = espero que
(7) 11:41 AM Roberto: cuando quieres algo, dices:
(8) 11:41 AM Sally: ohh si
(9) 11:41 AM Roberto: ojala!
(10) 11:42 AM Roberto: ojala literalmente quiere decir "si dios quiere"
(11) 11:42 AM Sally: jaja

(1) 11:40 AM Roberto: 'oh I'm sorry I don't know what's wrong with my connection'
(2) 11:40 AM Sally: ohh
(3) 11:40 AM Roberto: 'hopefully it won't happen again'
(4) 11:40 AM Sally: 'I don't understand'
(5) 11:41 AM Sally: 'hopefully it won't … again?'
(6) 11:41 AM Roberto: '*ojala* = I hope that'
(7) 11:41 AM Roberto: 'when you want something, you say:'
(8) 11:41 AM Sally: ohh 'yes'
(9) 11:41 AM Roberto: 'hopefully!'
(10) 11:42 AM Roberto: '*ojala* literally means "god willing"'
(11) 11:42 AM Sally: jaja

In all, Session 8 contained 6 meaning negotiations and one translation request – half the LREs of Session 7.

4.4.1.2.2 Conversation management & pragmatic markers

As in Session 7, Sally did not nominate a single topic. Moreover, she often avoided LREs sometimes by giving false, yet simpler responses to the interlocutor's questions (detailed in the following section), and by indicating that a meaning negotiation had been successful, when in fact it had not (see Exchange 21 below).

Exchange 21:
(1) 11:58 AM Roberto: ojala te despiertes a tiempo para las clases!
(2) 11:58 AM Sally: si. pero dormir es importante tambien.
(3) 11:59 AM Roberto: no, digo que si vas a dormir durante toda la semana
(4) 11:59 AM Sally: jaja si.

(5) 11:59 AM Roberto: ojala te despiertes antes de que la escuela empiece
(6) 12:00 PM Roberto: Ojala no duermas 2 semanas!
(7) 12:00 PM Sally: jaja
(8) 12:00 PM Think Aloud: I don't know what he is saying

(1) 11:58 AM Roberto: 'hopefully you'll wake up in time for classes!'
(2) 11:58 AM Sally: 'yes, but sleeping is important too.'
(3) 11:59 AM Roberto: 'no, I mean that if you're going to sleep for the whole week'
(4) 11:59 AM Sally: jaja 'yes'.
(5) 11:59 AM Roberto: 'hopefully you'll wake up before school starts'
(6) 12:00 PM Roberto: 'Hopefully you won't sleep 2 weeks!'
(7) 12:00 PM Sally: jaja
(8) 12:00 PM Think Aloud: I don't know what he is saying

In Exchange 21, it is interesting to note the added dimension that the think-aloud provides. From the text, it appears that the meaning negotiation was resolved by Line 4, when in fact it was not resolved at all.

Again, it is evident that Sally's *ja*'s are used almost exclusively as markers of solidarity. Even the *si* 'yes' in the above exchange is a marker of solidarity, and not comprehension, as might otherwise be suspected. In all, Sally produced 8 pairs of *ja*'s compared with Roberto, who did not produce any.

4.4.1.2.3 Metacognition

Sally opened the session by commenting aloud that she felt embarrassed and 'disappointed' in herself because she hadn't been practicing her Spanish over the summer break. She went on to say, "this is my last session, and I'm going to do my best on it, but I don't see how I could do any better than the first time I did it because I probably know half as much Spanish as I used to, which is really sad for me". She made another evaluative comment at 11:47 after responding affirmatively to Roberto's question as to

whether or not she made dinner: "I didn't really eat dinner, but I don't want to go in it because I don't know how to say it in Spanish." Sally's planning comments were too numerous and sometimes too unintelligible to tally. She mumbled quite a bit and would often say a word in English and then name several possible Spanish translations, speak the words she was typing, indicate that she was executing a correction, etc. On the whole, the comments that she clearly articulated had some evaluative elements to them, which may indicate something that was not anticipated in the methodology of this study: namely, that the metacognitive cycle cannot be clearly articulated until it is complete; that is, until the planning/monitoring experience has been evaluated. This finding makes understanding the relationship among planning one's next step, monitoring interaction and ID shifts more difficult to observe directly.

Of the remaining markers of evaluation/monitoring that were intelligible, there were 9 comments indicating that she did not know how to say something in Spanish, 6 comments indicating that she was sleepy/anxious/distracted and 3 comments that she did not understand the interlocutor.

There were no pauses that lasted over one minute, not including the pause that occurred due to the interlocutor's technical difficulties, and the interlocutor's evaluation of Sally's proficiency was 4.

4.4.2 Personality

The only pre- to post-session shift in Sally's BFI test items that reached a level of significance was a mean downward shift of -1.667 ($p = 0.0063$) in the 5-point Likert scale used to measure Subscale 1 (=openness), which occurred in Session 6. The biggest upward shift of 0.4 ($p = 0.4362$) in the same subscale occurred in Session 2. The

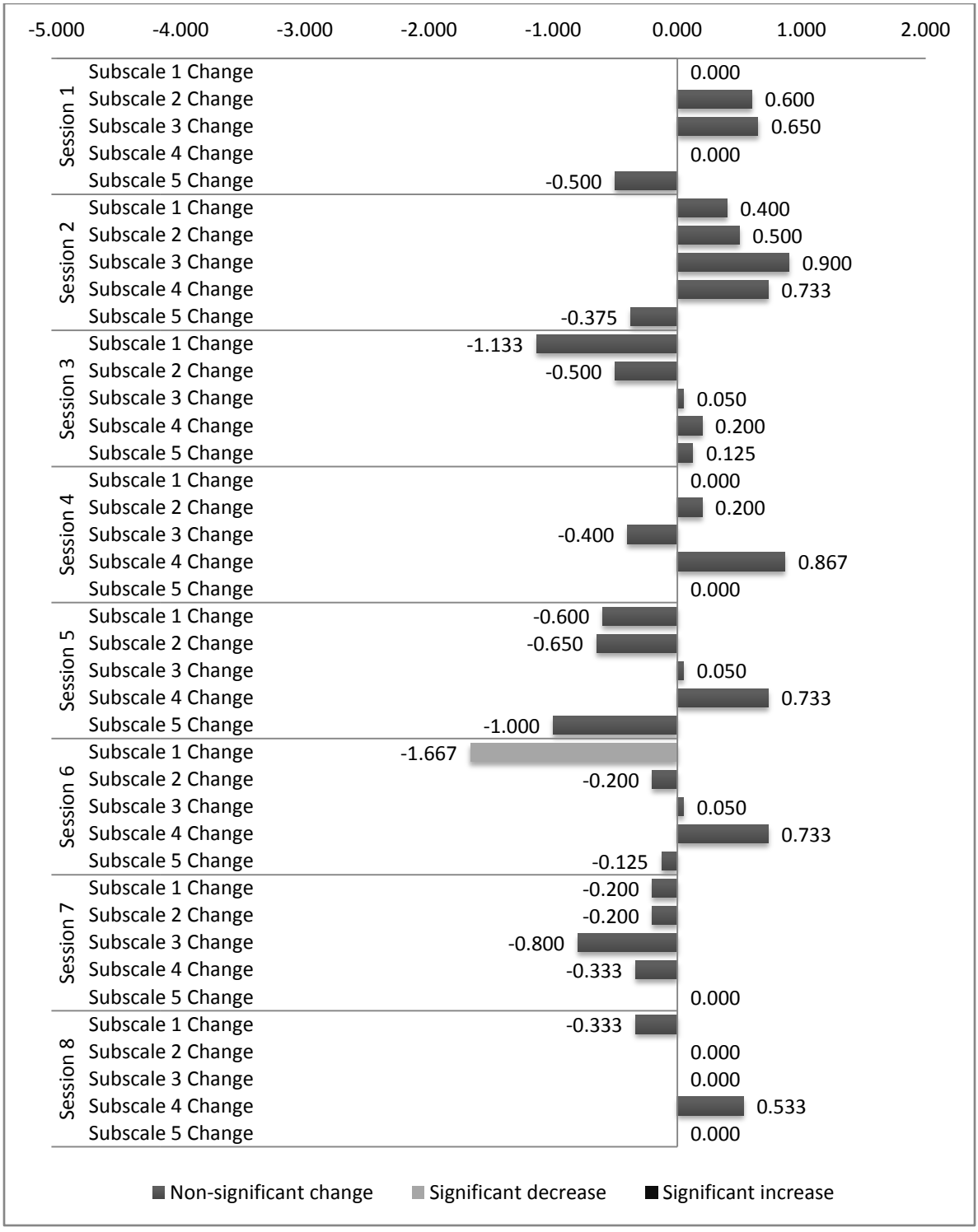

Table 10: Changes in Sally's BFI items from pre- to post-session

probability that the distance between these points is due to an error in measurement and does not represent a real difference lies at 0.0066, which makes comparison between the two sessions possible, if not ideal.

4.4.2.1 Session 6

Again, Session 6 represented the only significant shift in BFI (personality) test items. More specifically, there was a pre- to post-session shift of -1.667 (or 33%) in the 5-point Likert scale used to measure Subscale 1 (=openness). Session 6 lasted 25 minutes and contained 84 entries, 37 by Sally and the remaining 47 by Emilia, the interlocutor.

4.4.2.1.1 Language-related episodes

There were a total of 8 LREs, which included 6 meaning negotiations, one code-switch/translation request, and one clarification request. The LREs were brief and did not last more than 4 TCUs, unless they initially went unnoticed and were reinitiated. A typical LRE is given in Exchange 22 below.

Exchange 22:

(1) 11:01 AM Emilia: tuve una confusion de horarios
(2) 11:02 AM Sally: horarios?
(3) 11:02 AM Emilia: si de hora (tiempo)
(4) 11:02 AM Sally: oh, si

(1) 11:01 AM Emilia: 'I got my schedule confused'
(2) 11:02 AM Sally: 'schedule?'
(3) 11:02 AM Emilia: 'yes of time (time)'
(4) 11:02 AM Sally: oh, 'yes'

Additionally, as noted with other participants, Sally's think-aloud data revealed two other non-interactive LREs. Sally indicated that she did not understand Emilia's use of *UAU!!!* 'wow!!!' nor her request, *enviame cupones* 'send me coupons.' Sally elected not to bring these misunderstandings to Emilia's attention.

4.4.2.1.2 Conversation management & pragmatic markers

Emilia nominated the only topic, work, which lasted through the entire session. The conversation centered primarily on what Emilia and Sally did for work and the fact that it was very time consuming and tiring. Sally produced 4 sets of 2 *ja*'s and Emilia produced one set of 3 and one set of 2 *ja*'s.

4.4.2.1.3 Metacognition

There were roughly 20 intelligible comments made as part of the think-aloud protocol. As in Sessions 7 and 8 analyzed above, the comments were predominantly negative in tone. Sally made two positive comments indicating that she was successful in resolving a non-interactive LRE (without assistance). Additionally, on one occasion, she thought it was interesting that she noticed the relationship between the Spanish word, *gemelas* 'twins,' and the English word, *Gemini*. She made 3 neutral comments that exhibited elements of monitoring and evaluation and began with "I think I just said" (11:07), "I think that means" (11:08), and "I didn't realize this was the same person as before" (11:10).

Of Sally's 15 negative comments, 12 showed elements of monitoring. These comments fell into 4 categories: "I don't remember how to say" (4 tokens), "I'm feeling

nervous/disappointed" (3 tokens), "I'm feeling stressed/rushed (because) I need to get back to work" (2 tokens), and "I don't know what that means" (3 tokens). Three additional comments were more evaluative: "I feel dumb because all I can say is 'good you?' whenever she asks a question" (11:03), "Every time I do one of these (sessions) I realize how much I miss speaking Spanish but it's hard for me to keep up with and it also makes me sad that I haven't been keeping up with it" (11:09), "I feel like I'm saying *sí* a lot (.) it's kind of embarrassing because it shows that I don't know a lot of vocabulary" (11:21).

The overall negative tone of Session 6 (as well as that of Sessions 7 and 8) is in line with the fact that each shows a negative (though not always significant) shift in Subscale 1 (=openness). It appears as though Sally sees herself as more consistent/cautious rather than open/curious after these sessions.

There were two pauses of over 1 minute, both when Emilia held the floor, presumably because she was thinking of another topic to nominate. The final proficiency ranking was 5 out of a possible 10 points.

4.4.2.2 Session 2

While Session 2 did not represent a significantly positive pre- to post-session shift in Subscale 1, it nonetheless had the *greatest* positive shift, which was significantly different than the significant, negative shift seen in the same subscale for Session 6. It is therefore cautiously used as a counterpoint for Session 6. Session 2 lasted 30 minutes, not including a 6-minute interruption due to technical difficulties. It contained 379 words and 104 entries, 41 by Sally and the remaining 63 by Emilia, the interlocutor. It should be noted that this session contained far more words and entries than Session 6.

4.4.2.2.1 Language-related episodes

Although there were relatively few LREs, 4 meaning negotiations and one translation request in all, one LRE was particularly long and complex. It was primarily a meaning negotiation of the word *olvidar* 'to forget', which spanned 23 TCUs (roughly 6 minutes) and culminated in the Exchange 23 below.

Exchange 23:

(1) 11:08 AM Emilia: recordar -lo opuesto es- olvidar
(2) 11:09 AM Sally: si
(3) 11:09 AM Emilia: bien
(4) 11:09 AM Emilia: vamos a usar eso, que te parece
(5) 11:09 AM Emilia: cada vez que quieras saber de una palabra
(6) 11:10 AM Emilia: te dire el significado y lo opuesto tambien
(7) 11:10 AM Sally: eh, no comprendo..
(8) 11:10 AM Emilia: (Sally), como va la escuela

(1) 11:08 AM Emilia: 'remember –the opposite is- forget'
(2) 11:09 AM Sally: 'yes'
(3) 11:09 AM Emilia: 'good'
(4) 11:09 AM Emilia: 'let's use that, what do you think'
(5) 11:09 AM Emilia: 'any time that you want to know about a word'
(6) 11:10 AM Emilia: 'I'll tell you its meaning and the opposite as well'
(7) 11:10 AM Sally: eh, 'I don't understand'..
(8) 11:10 AM Emilia: '(Sally), how is school going'

Despite this apparent failure to negotiate the nature of future LREs, Emilia recycles this LRE on two other occasions throughout the sessions by using the word *opuesto* 'opposite' in two other LREs and she also (over)uses *recordar* 'to remember' and *olvidar* 'to forget' in different contexts in an apparent attempt to help Sally remember the newly learned lexical items. Here again, we see the LRE, not as a discrete event, but as a periodic and multi-dimensional focus on form.

Sally even playfully acknowledges that she has learned the word in the final exchange of the conversation, shown in Exchange 24 below.

Exchange24:

(1) 11:20 AM Emilia: bien, hemos terminado la sesion por hoy
(2) 11:21 AM Emilia: no olvides la proxima vez "el microfono"
(3) 11:21 AM Sally: ok. si, no olvido!

(1) 11:20 AM Emilia: 'good, we've finished the session for today'
(2) 11:21 AM Emilia: 'don't forget "the microphone" next time'
(3) 11:21 AM Sally: ok. 'yes, I don't forget!'

4.4.2.2.2 Conversation management & pragmatic markers

Session 2 contained two unusual events. The first occurred when Sally interrupted the typical interview frame to discuss the fact that she was having trouble with her microphone. This episode is shown in Exchange 25 below.

Exchange 25:

(1) 10:46 AM Sally: hola
(2) 10:47 AM Emilia: Hola, como estas?
(3) 10:47 AM Emilia: todo bien?
(4) 10:47 AM Sally: si, bien. y tu?
(5) 10:47 AM Emilia: muy bien, gracias!
(6) 10:49 AM Sally: i don't know if my voice is recording.
(7) 10:50 AM Emilia: click in microphone
(8) 10:52 AM Sally: i did, but my microhphone isn't picking anything up. i'm
(9) sorry.
(10) 10:52 AM Emilia: maybe is not working properly
(11) 10:52 AM Emilia: hold on
(12) 10:52 AM Sally: okay
(13) 10:53 AM Emilia: are you in the campus?
(14) 10:53 AM Sally: yes
(15) 10:53 AM Emilia: there is any other computer that you can use?
(16) 10:54 AM Emilia: woodward 137- computers lab
(17) 10:54 AM Sally: okay. do i have time?
(18) 10:55 AM Emilia: it's ok just do it wtihout it.
(19) 10:55 AM Sally: ok. i'm sorry. que hiciste el fin de semana?

(20) 10:55 AM Emilia: esta bien, no hay problema
(21) 10:56 AM Emilia: quizas puedas usar otra computadora la proxima vez.
(22) 10:56 AM Emilia: Creo que es requisito tener el microfono encendido
(23) 10:56 AM Emilia: pero por hoy esta bien.
(24) 10:57 AM Emilia: (Sally), todo bien?
(25) 10:57 AM Sally: si bien
(26) 10:57 AM Emilia: este fin de semana estuve tan cansada

(1) 10:46 AM Sally: 'hello'
(2) 10:47 AM Emilia: 'Hello, how are you?'
(3) 10:47 AM Emilia: 'is everything well?'
(4) 10:47 AM Sally: 'yes, well, and you?'
(5) 10:47 AM Emilia: 'very well, thanks!'
(6) 10:49 AM Sally: i don't know if my voice is recording.
(7) 10:50 AM Emilia: click in microphone
(8) 10:52 AM Sally: i did, but my microhphone isn't picking anything up. i'm
(9) sorry.
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(15) 10:53 AM Emilia: there is any other computer that you can use?
(16) 10:54 AM Emilia: woodward 137- computers lab
(17) 10:54 AM Sally: okay. do i have time?
(18) 10:55 AM Emilia: it's ok just do it wtihout it.
(19) 10:55 AM Sally: ok. i'm sorry. 'what did you do last weekend?'
(20) 10:55 AM Emilia: 'it's OK. no problem'
(21) 10:56 AM Emilia: 'maybe you can use a different computer next time.'
(22) 10:56 AM Emilia: 'I think you're supposed to have the microphone turned on'
(23) 10:56 AM Emilia: 'but today it's OK.'
(24) 10:57 AM Emilia: '(Sally), is everything OK?'
(25) 10:57 AM Sally: 'yes fine'
(26) 10:57 AM Emilia: 'last weekend I was so tired'

Throughout this exchange, Sally determined the code. She started in Spanish, then switched to English in Line 6, and then switched back to Spanish in Line 19. Each time Sally switched, Emilia followed suit. Indeed, Emilia followed Sally's cue and

switched to Spanish in Line 19, even though she remained on the same topic. The other remarkable even that is shown in the same exchange is that not only did Sally initiate the first exchange, but she also nominated the first topic of conversation in Line 19. Taken together, it appears as though Sally controlled the conversation for over 10 minutes, a feat she would not repeat in her remaining six sessions.

Sally and Emilia also acknowledged that they had a shared history by recalling their previous, first conversation. Emilia remembered that Sally wanted to be a teacher and Sally remembered that Emilia liked to cook. This reaffirmation of shared history was a move not repeated in the other sessions analyzed.

Sally produced one pair of *ja*'s and Emilia produced 3 sets of 3 *ja*'s – all apparent markers of solidarity. This is the only session in which Emilia's *ja*'s outnumbered Sally's.

4.4.2.2.3 Metacognition

Unfortunately, Sally experienced microphone difficulties during the session, which made her think-aloud data irretrievable. Shortly after the session, I asked her to relay to me her evaluation of the experience. She replied that she thought it had been a positive experience, and she enjoyed speaking with Emilia. It would be ideal if this positive evaluation were manifest in the think-aloud data, but methodologically questionable to compare a single, retrospective evaluation with the simultaneous think-aloud data of Session 6. Recall that Sessions 6, 7 and 8 all had predominantly negative comments and negative pre- to post-session shifts in Subscale 1 (=openness). Session 2 had one retrospective positive evaluation, supported by more successful conversation management, as well as a significantly different, positive shift in Subscale 1. The

potential connection between openness and negative think-aloud data is interesting, though presently vague. It would seem plausible, however, that repeated self-deprecation could render a learner more cautious (=less open), which in turn could make them less apt to connect with a NS, or take other risks to increase their language skills.

There were no pauses that lasted longer than one minute (other that when Sally reported having microphone difficulties) and the final proficiency rating by the interlocutor was 4 out of a possible 10 points.

4.4.3 Reading Span

Sally's pre- to post-session changes in reading span reveal no significant shifts and no differences between the greatest shifts that approach significance. Therefore, any comparisons between sessions would be entirely speculative.

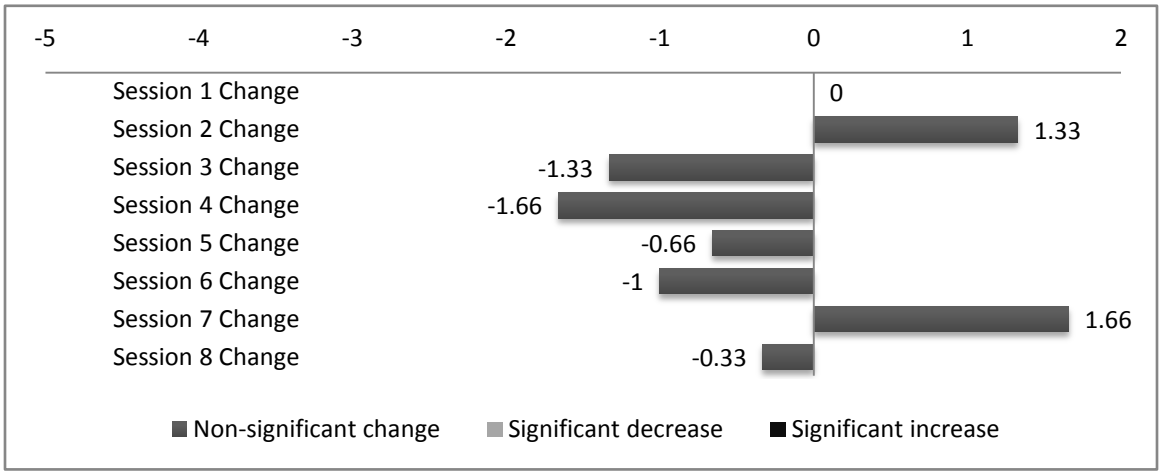

Table 11: Changes in Sally's Reading Span from pre- to post-session

4.4.4 Summary

Again, the spike in LREs in Session 7 coincided with a substantial negative shift in a pre- to post-session desire to learn Spanish (=AMTB Subscale 2). When compared with Session 8, Session 7, with the highest positive pre- to post-session shift in the same subscale, had twice the number of LREs, and the lengthiest LRE took twice the time and twice the TCUs to resolve. Recall that this same negative correlation between LRE frequency and attitudes and motivation is evident in both of the case studies previously reviewed.

The think-aloud data in Sessions 7 and 2 hinted at the possibility that the LREs contained within the textual data might only be the tip of the proverbial iceberg. In Session 7, Sally could not remember how to issue an apology, and decided to indicate laughter instead. These precursors to laughter would presumably be quite different from those of NS laughter and might be indicators of even more LREs that are not plainly visible within the interactional data (cf. Sandra's 'non-interactional' LREs). It is not difficult to imagine, even though it did not actually happen, that if the NS had just happened to apologize later in the session, Sandra would have paid particular attention to the form of that apology, just as she might have in a typical recast or meaning negotiation sequence. The only differences between this episode and more canonical, interactive LREs was that Sandra did not want to bring her interlanguage 'deficiency' to her interlocutor's attention and she was willing to accept the possibility that it might not be resolved. This does not mean that it lacked any of the focus on form and heightened sensitivity to particular input within the context of interpersonal communication that are generally believed to be fundamental to both LREs and second language learning (Long 1996).

It may well be that canonical LREs that are visible within the interactional data are simply a subset of LREs that, driven by the need to maintain the flow of conversation, overwhelm a learner's desire to save face. Perhaps canonical LREs should be reframed as but one possible manifestation of an interaction-motivated focus on form: not to downplay the value of immediate, NS feedback, but rather to weigh the importance of such feedback against the concomitant negative threats to face (which would occur not only when the learner hears the feedback, but also replies with thanks or excuses). This seems like a reasonable perspective for learners to take when deciding whether or not to expose their interlanguage deficiencies by initiating an LRE. Of course, when the interlocutor initiates the LRE due to a learner's (inadvertent) non-targetlike production, then the only countermeasure a learner can take would be to say that they have understood the feedback, when in fact they have not. Regardless of the outcome of an LRE (be it canonical or otherwise), I would argue that the sometimes opposing forces that shape them are the same and that no LRE is guaranteed to result in meaningful feedback (as was noted in Session 8). It is difficult if not impossible to capture every non-canonical LRE, and for now it is sufficient to say that canonical LREs coincide with downward shifts in pre- to post-session AMTB test items, but future research might illuminate with more clarity the apparent complex nature of LREs and its ties to learners' attitudes and motivations.

From the interlocutor's perspective, the boundaries of LREs can be equally as elusive. In Session 2, for example, the same meaning negotiation that began the session kept surfacing throughout the session and was eventually used as a closing point for the conversation. If NSs taking on the teacher role can skew the frequency of a lexical item to reinforce a particular LRE, then where exactly is the boundary of the LRE? With each successive use of the word *olvidar* 'to forget' in Session 2, its corresponding LRE

became an obvious subtext of the conversation as well as a matter of language play. Thus the nature of the LRE as revealed through these sessions appears to be fractal in nature.

With respect to Sally's pre- to post-session personality shifts, her control of a large portion of the conversation in Session 2, coupled with the language play surrounding the word *olvidar* 'to forget,' may have led to a significantly more positive shift in her degree of openness (=Subscale 1).

Another aspect of Sally's think-aloud data that stood out was the fact that it nearly always had a negative tone, which may well explain the negative shifts in Subscale 1 for Sessions 6, 7 and 8. While learner anxiety has been widely noted in the literature (e.g. Horwitz 2001), relatively little has been said about the systematicity of other negative affective factors, such as fatigue, distraction, frustration, self-deprecation, and hopelessness. These factors were at least as prominent as anxiety in Sally's think-aloud data and merit further investigation.

4.5 CASEY

At the time of the study, Casey was a 19-year-old female. She was currently enrolled in a fifth-semester Spanish course at St. Edward's university and had previously studied Spanish for 3 semesters, pursuing a Spanish minor. She was a NS of English and spoke no other languages at home.

4.5.1 Attitudes and Motivation

Of all the participants in this study, Casey experienced the second greatest mean pre- to post-session *negative* shift (-0.03333 on the 7-point Likert scale used to measure

AMTB items) (see Table 12 below). Only John exhibited a bigger drop in his average post-session attitudes and motivation. Additionally, Casey's series had the second lowest standard deviation (0.3667), which indicates that her reactions to the sessions were

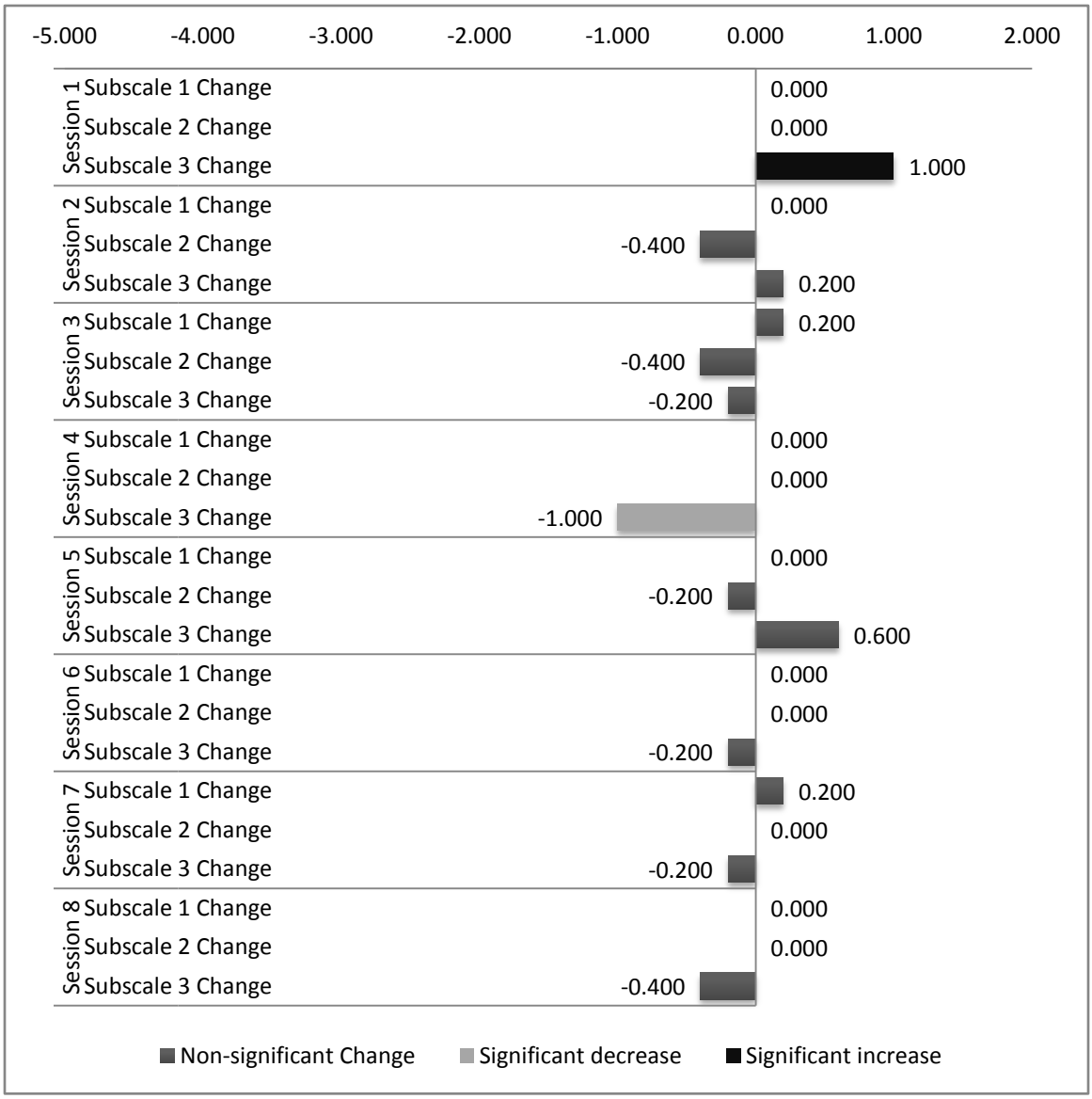

Table 12: Changes in Casey's AMTB items from pre- to post-session

among the most predictable. Taken together, these findings may indicate that (1) Casey did not view this treatment as a particularly motivating experience, (2) Casey's attitude/motivation profile was not very stable when compared with the other participants, or (3) Casey's reaction, though not stable, was comparatively predictable.

In Casey's case, the points of comparison are clear. In Session 1, she experienced a significant, *positive* pre- to post-session shift in AMTB Subscale 3 (=motivational intensity) ($p = 0.0098$), and in Session 4, she experienced a significant *negative* pre- to post-session shift in the same subscale ($p = 0.0148$).

4.5.1.1 Session 1

Session 1 comprised 350 words that spanned 125 entries, of which 79 were by Casey and the remaining 46 were by Emilia, the interlocutor. Session 1 was the only one that exhibited a significant, positive shift in AMTB Subscale 3 (= motivational intensity) ($p = 0.0148$).

4.5.1.1.1 Language-related episodes

There were 2 translation requests and 1 meaning negotiation in Session 1. The two translation requests were somewhat protracted, as illustrated in Exchange 27.

Exchange 27:

(1) 10:24 AM Casey: porque esta (como se dice snowing?)
(2) 10:25 AM Emilia: adivina! (guess)
(3) 10:25 AM Casey: jaja
(4) 10:25 AM Casey: um..
(5) 10:25 AM Casey: empieza con n
(6) 10:25 AM Casey: me olvide
(7) 10:25 AM Emilia: si, es la misma palabra para 'ice cream'
(8) 10:25 AM Casey: ohh
(9) 10:25 AM Casey: hielo?

(10) 10:26 AM Emilia: si, helado o nieve
(11) 10:26 AM Emilia: esta nevando
(12) 10:26 AM Casey: ahhh
(13) 10:26 AM Casey: si
(14) 10:26 AM Casey: esta nevando

(1) 10:24 AM Casey: 'why is it (how do you say *snowing*?)'
(2) 10:25 AM Emilia: 'guess!' (guess)
(3) 10:25 AM Casey: jaja
(4) 10:25 AM Casey: um..
(5) 10:25 AM Casey: 'it begins with an n'
(6) 10:25 AM Casey: 'I forgot'
(7) 10:25 AM Emilia: 'yes, it's the same word as "*ice cream*"'
(8) 10:25 AM Casey: ohh
(9) 10:25 AM Casey: 'ice?'
(10) 10:26 AM Emilia: 'yes, ice cream or ice cream'
(11) 10:26 AM Emilia: 'it's snowing'
(12) 10:26 AM Casey: ahhh
(13) 10:26 AM Casey: 'yes'
(14) 10:26 AM Casey: 'it's snowing'

On both occasions, Emilia asked Casey to guess before giving her the target lexical item. Given the trend set by the participants previously reviewed, this protracted LRE would be expected to place downward pressure on at least one AMTB subscale. If in fact it did, in this case such pressure was not enough to counteract the significant positive shift seen in Subscale 3.

4.5.1.1.2 Conversation management & pragmatic markers

Emilia nominated 4 of the topics of conversation: school/studies, home towns, Texas, and psychology. The only topic nominated by Casey was precipitated by what she thought was a problem with her computer, but in reality it was a participant who was scheduled for the following session, who inadvertently and momentarily joined the forum. The incident interrupted the interaction for less than one minute, and Casey

followed up by issuing what appeared to be a light-hearted apology for the momentary glitch.

Casey and Emilia discovered a shared interest in psychology and a shared career goal of eventually becoming counselors. Casey produced four sets of two *ja*'s and Emilia did not produce any.

4.5.1.1.3 Metacognition

Casey's think-aloud data was remarkably more positive than Sally's. Casey laughed frequently and also made several positive evaluations. They included "this seems easy" (10:16), "(this person) seems very nice" (10:17), "I'm a little confused about what they said but it's all good (.) they're very nice and very helpful" (10:27), and "alright (.) it's over and it was successful (.) I'm leaving now" (10:36). Her comments were never negative in tone nor were they self-deprecating; even when she admitted not knowing how to say something, she would usually punctuate with laughter.

Another feature of Casey's think-aloud data was that it included many more markers of planning and monitoring than the other participants reviewed thus far. This finding may be attributable to the fact that Casey was nearly 4 semesters ahead of Sally, Sandra and Lori in the Spanish sequence at St. Edward's University. Her greater level of proficiency probably allowed her the capacity to focus more fully on her metacognitive processes. There were 5 comments that were primarily evaluative (e.g. "they seem very nice" (10:17)), 6 comments that were primarily markers of monitoring (e.g. "I'm putting *ja* with j-a like my *primas de Argentina* so I guess the person understands it" (10:27)) and 6 comments that show a combination of monitoring and planning (e.g. "Oh God (.) how

do I say research (.) uh (.) uh (.) um (.) uh (.) uh (.) uh (.) I don't know how to say research (.) I'm going to ask the person" [10:32]).

Emilia ranked Casey's proficiency at 6 out of a possible 10 points.

4.5.1.2 Session 4

Session 4 contained 380 words that spanned 112 entries, of which 60 were by Casey and the remaining 52 were by Emilia, the interlocutor. Session 1 was the only session that exhibited a significant, negative shift in AMTB Subscale 3 (= motivational intensity) ($p = 0.0098$). Session 4 is an ideal counterpoint to Session 1, since both have significant, yet opposite, pre- to post-session shifts in the same subscale.

4.5.1.2.1 Language-related episodes

Session 4 contained 2 translation requests and 1 meaning negotiation. Additionally, this session contained Casey's only recast (see Exchange 28 below).

Exchange 28:

(1) 10:31 Casey: mis amigas quierian que yo salia con ellas
(2) 10:31 Casey: pero estaba muy cansada
(3) 10:32 Emilia: (Casey) es major decir: mis amigas querian que *saliera con
(4) ellas…
(5) 10:32 Emilia: saliera es la forma subjuntiva
(6) 10:33 Emilia: entiendes?
(7) 10:33 Casey: ooh si, gracias

(1) 10:31 Casey: 'my friends wanted me to go out with them'
(2) 10:31 Casey: 'but I was very tired'
(3) 10:32 Emilia: '(Casey) it's better to say: my friends wanted me to *go out with' ((recast))
(4) 'them…'
(5) 10:32 Emilia: '*saliera* is the subjunctive form'
(6) 10:33 Emilia: 'do you understand?'
(7) 10:33 Casey: ooh 'yes, thank you'

All of the other LREs in Sessions 1 and 4 are initiated by Casey. This is the first to be initiated by Emilia, and it may have had a particularly strong impact on Casey's motivation and attitudes.

4.5.1.2.2 Conversation management & pragmatic markers

In Session 4, all of the 4 topics of conversation were nominated by Emilia. They were: the weather, Casey's recent tests, the previous weekend and plans to visit home. The only exchanges initiated by Casey were follow-up questions to previously nominated topics. Casey produced 3 sets of 2 *ja*'s and Emilia produced 1 pair and 1 set of three *ja*'s, all of which were apparent markers of solidarity.

4.5.1.2.3 Metacognition

Session 4 was very similar to Session 1 in terms of the think-aloud data. There were no negative comments made and, again, many of Casey's admissions that she did not know how to say something were punctuated by laughter. In all, there were 6 comments that were mostly evaluative (e.g. "that's cool" [10:18]), 4 that were markers of monitoring (e.g. "I'm not sure that's right" [10:24]) and 5 that contained elements of planning and monitoring (e.g. "uh (.) enjoy enjoy (.) I can't remember how to say enjoy (.) I'll just stick with *gustó*" [10:26]).

Emilia ranked Casey's proficiency at 4 out of a possible 10 points.

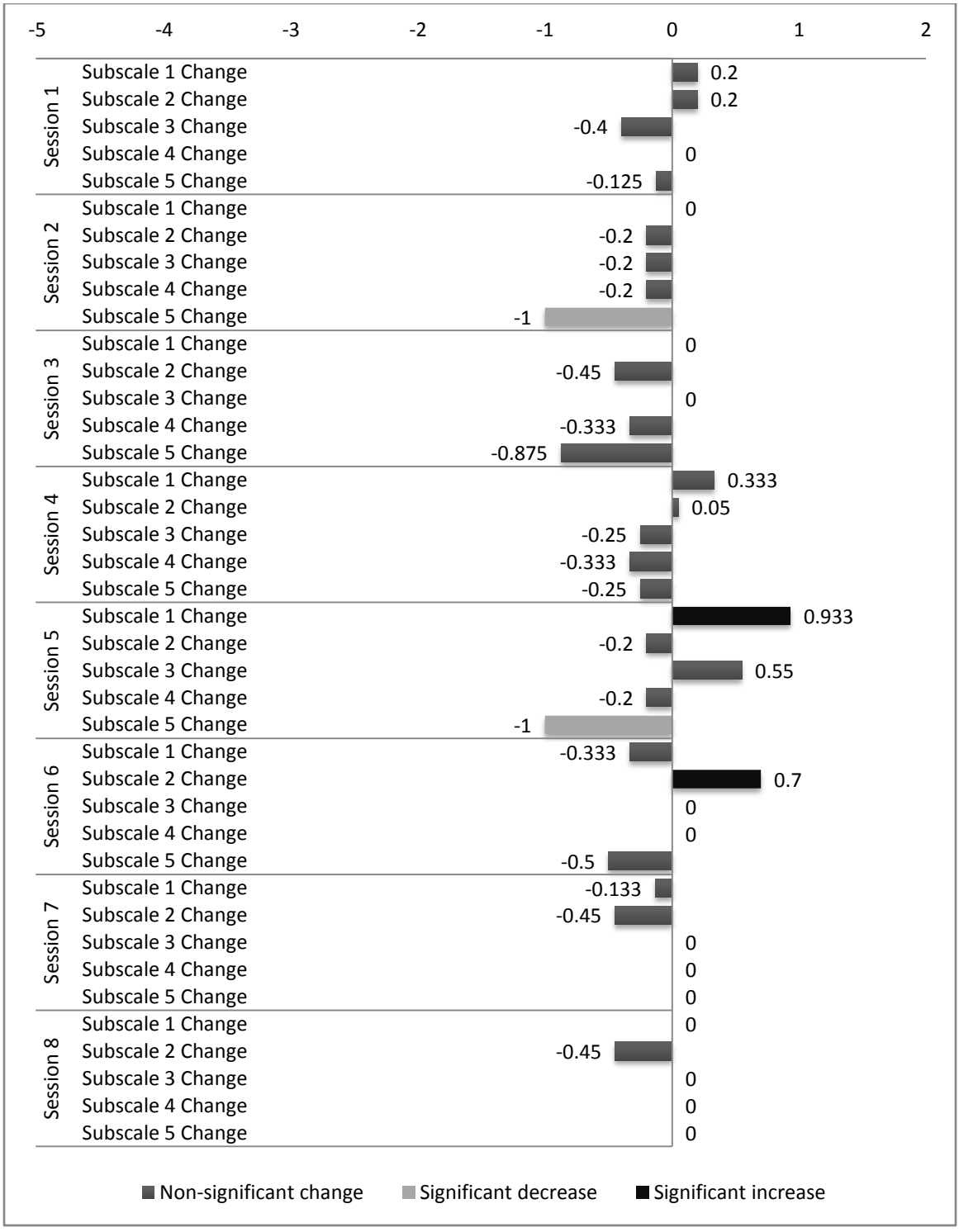

Table 13: Changes in Casey's BFI items from pre- to post-session

4.5.2 Personality

The most interesting comparison to be made with regard to the pre- to post-session BFI shifts is between Sessions 2 and 5 (see Table 13 above). Both sessions exhibited an identical, significant, negative shift in Subscale 5 (=neuroticism) ($p = 0.0089$). Moreover, Session 5 has a significant, positive pre- to post-session shift in Subscale 1 (=openness) ($p = 0.0089$), which is significantly different than the zero shift seen in Session 2 for the same subscale ($p = 0.0465$). What may have identically affected Subscale 5, but variably affected Subscale 2 in the two sessions?

4.5.2.1 Session 5

Session 5 contained 712 words that spanned 49 entries, 26 of which were by Casey and the remaining 23 by Emilia, the interlocutor. Again, Session 5 is used as a point of comparison because it had both a significant, negative pre- to post-session shift in Subscale 5 (=neuroticism) *and* a significant, positive pre- to post-session shift in Subscale 1 (=openness). What this suggests is that by the end of the session, Casey likely became less sensitive/nervous and more inventive/curious than she was at the beginning of the session.

The session lasted only 10 minutes, due to the fact that Casey was very late and another participant, John, was waiting to begin his session.

4.5.2.1.1 Language-related episodes

There was only one LRE in Session 5. It was a meaning negotiation of the word *alfajores* (an Argentinean snack). None of the think-aloud data indicated that there were any non-interactive LREs.

4.5.2.1.2 Conversation management & pragmatic markers

There were two notable events that took place during this brief conversation. The first occurred when Casey issued an apology for being 23 minutes late to the session. She issued the apology in English, (see Exchange 29).

Exchange 29:

(1) 10:23 AM Casey: I'm so sorry I'm late! Is there any way we can still do
(2) the chat?
(3) 10:24 AM Emilia: sure
(4) 10:24 AM Casey: good

This is clearly more serious than the brief computer glitch for which Casey apologized in Session 1. The pragmatic weight of the need to issue a sincere apology and negotiate a potential rescheduling of the chat apparently overwhelmed Casey's L2 resources. She probably anticipated being late as she completed her pre-survey, which may well explain why she was more sensitive/nervous prior to the session than she was afterward.

The second event occurred 6 minutes into the session when John entered the chat session at his appointed time. Emilia had to negotiate a later time with John in order to finish the session with Casey, but he readily agreed to wait an additional 5 minutes without raising any objections or indicating any displeasure. It seems possible that Casey felt more at ease through the course of the interaction, which might have negatively impacted Subscale 5. It is, however, difficult to determine to what extent Casey's heightened initial nervousness would be attributable to Casey's aversion to being late (=situational factor) or her need to make amends to a speaker of another language (=discursive factor).

The only topic of discussion was vacation plans, which led to a discussion about Argentina. The topic was nominated by Emilia.

4.5.2.1.3 Metacognition

Casey made only 3 intelligible comments during the think-aloud protocol. The first was an apology for being late. Presumably, the apology was directed at me, as Casey knew that I would be the only one listening to the think-aloud data. Perhaps it may have also been a reflection of the apology Casey issued to Emilia in the text-based chat. Additionally, Casey said, "I don't know what to say" (10:28), which was monitoring/evaluative comment in which Casey indicated her inability to nominate the following topic. Especially given the tone of the comment, it appeared that Casey found the pause to be uncomfortable. Her final comment, "I'm going to Argentina in July" (10:32), was said in an enthusiastic tone, apparently an intensifier of a similar text-based entry made immediately beforehand. Casey made several allusions to Argentina and to her Argentinean relatives in other sessions. In fact, as she mentioned to me outside of the sessions, one of her prime motivations for learning Spanish is to identify more closely with her Argentinean family. In Session 1, for example, Casey mentioned that she was trying to emulate her cousins in Argentina by using the Spanish *ja* instead of the English *ha*. The other participants learned the Spanish orthography in the sessions, but Casey apparently has had more prior experience in this mode of communication.

It is possible that Casey's enthusiasm for all things Argentine explains her ability to stay on the topic for nearly the entire conversation, her desire to negotiate the meaning of *alfajores*, her enthusiastic comment about her plans to visit Argentina, and also her increased openness and curiosity at the end of the session as revealed by the significant

pre- to post-session increase in Subscale 1. This marks the first instance that such a personality shift is evident in LREs, conversation management, and the think-aloud data combined.

Emilia's ranking of Casey's proficiency was 4 out of a possible 10 points.

4.5.2.2 Session 2

Session 2 contained 613 words that spanned 128 entries, of which 70 were by Casey, and the remaining 58 were by Emilia, the interlocutor. It is used as a point of comparison with Session 5, because it saw an identical, significant pre- to post-session decrease in Subscale 5 (=neuroticism), but a significantly lower pre-to post session increase in Subscale 1 (=openness).

4.5.2.2.1 Language-related episodes

Session 2 contained 4 LREs. On one occasion Casey asked Emilia if the sentence she had just produced (*que divertido* 'how fun') was well-formed, to which Emilia replied that it was *perfecto* 'perfect'. There was one translation request for the word *congratulations*, and there was one self-correction and explanation by Emilia surrounding the use of the terms *novio* and *enamorado/enamorada* 'boyfriend/girlfriend'. The most interesting of the LREs were the two meaning negotiation sequences, one concerning the term *disfrutar* 'to enjoy' and another concerning the word *bromeando* 'kidding'. In both instances, Casey indicated that the negotiation had been successful, when in fact it had not (see Exchanges 30 and 31 below).

Exchange 30:

(1) 10:09 AM Emilia: disfruta todo lo que puedas
(2) 10:09 AM Casey: que significa disfruta?
(3) 10:10 AM Emilia: disfrutar
(4) 10:10 AM Emilia: te voy a dar unos ejemplos
(5) 10:10 AM Casey: bien
(6) Think aloud: ejemplos (.) examples (.) oh my gosh (.) my brain
(7) 10:10 AM Emilia: disfruta de la vida! disfruta del amor!
(8) 10:10 AM Casey: ohh
(9) 10:10 AM Casey: lo entiendo
(10) Think aloud: lo entiendo (.) I think
(11) 10:10 AM Emilia: entendiste?
(12) 10:10 AM Casey: si
(13) Think aloud: kind of like (.) um (.) you know (.) I think I get the
(14) understanding (.) my Spanish professors use it
(15) 10:11 AM Emilia: preguntame lo que quieras, cuando quieras
(16) 10:11 AM Casey: gracias
(17) 10:11 AM Emilia: de nada

(1) 10:09 AM Emilia: 'enjoy as much as you can'
(2) 10:09 AM Casey: 'what does enjoy mean?'
(3) 10:10 AM Emilia: 'to enjoy'
(4) 10:10 AM Emilia: 'I'm going to give you some examples'
(5) 10:10 AM Casey: 'good'
(6) Think aloud: ejemplos (.) examples (.) oh my gosh (.) my brain
(7) 10:10 AM Emilia: 'enjoy life! enjoy love!'
(8) 10:10 AM Casey: ohh
(9) 10:10 AM Casey: 'I understand it'
(10) Think aloud: 'I understand it' (.) I think
(11) 10:10 AM Emilia: 'did you understand?'
(12) 10:10 AM Casey: 'yes'
(13) Think aloud: kind of like (.) um (.) you know (.) I think I get the
(14) understanding (.) my Spanish professors use it
(15) 10:11 AM Emilia: 'ask me whatever you want, whenever you want'
(16) 10:11 AM Casey: 'thank you'
(17) 10:11 AM Emilia: 'you're welcome'

In Line 6, Casey recalled the meaning of *ejemplos* 'examples' only after she responded to Emilia's use of the word. What is even more interesting is that she

indicated twice that she understood the meaning of *disfruta* 'enjoy,' when she in fact was still working toward an understanding.. Finally, Emilia assumed the role of teacher particularly in the last three lines. She would make a similar move on two other occasions during the session.

Exchange 31:

(1) 10:19 AM Emilia: hace cuanto tiempo estan juntos?
(2) 10:19 AM Casey: hace un ano
(3) 10:19 AM Casey: el dos de marzo fue nuestro aniversario
(4) 10:19 AM Emilia: Wow, eso es bastante para alguien que tiene 19 anos!
(5) 10:19 AM Casey: si
(6) 10:20 AM Emilia: ja,ja,ja solo estoy bromeando
(7) 10:20 AM Casey: que quiere decir bromeando?
(8) 10:20 AM Emilia: broma, juego, hacer reir
(9) Think-aloud: oh (.) a game (.) something (.) game (.) to make smile (.) I
(10) think I understand
(11) 10:20 AM Casey: oh
(12) 10:21 AM Casey: jaja
(13) 10:21 AM Casey: bien

(1) 10:19 AM Emilia: 'how long have you been together?'
(2) 10:19 AM Casey: 'for one year'
(3) 10:19 AM Casey: 'March second was our anniversary'
(4) 10:19 AM Emilia: 'Wow, that's a lot for a 19-year-old!'
(5) 10:19 AM Casey: 'yes'
(6) 10:20 AM Emilia: ja,ja,ja 'I'm just kidding'
(7) 10:20 AM Casey: 'what does kidding mean?' ((meaning negotiation))
(8) 10:20 AM Emilia: 'joke, game, to make laugh'
(9) Think-aloud: oh (.) a game (.) something (.) game (.) to make smile (.) I
(10) think I understand
(11) 10:20 AM Casey: oh
(12) 10:21 AM Casey: jaja
(13) 10:21 AM Casey: 'good'

Again, it is apparent that text-based LREs cannot always be taken at face value. It appears that the think-aloud protocols help tease apart learning moments from disengagement as an attempt to save face. Moreover, it appears as though conversation management strategies, in addition to being a potential locus of L2 learning, can also directly conflict with a learner's willingness to focus on form, essentially rendering the LRE useless, if not counterproductive.

4.5.2.2.2 Conversation management & pragmatic markers

In addition to the discussion above, it should be noted that Casey did not nominate any topics during the conversation. As in Session 5, Casey mentioned that she would be traveling to Argentina; however, the exchange did not dominate the conversation as it did in Session 5. The exchange only lasted 2 minutes, and was again cut short by John momentarily entering the session thinking that it was his. Emilia left abruptly to join John's session, which appeared mildly offensive to Casey. Her think-aloud response to Emilia's departure was "I guess that's it".

Emilia produced 2 sets of 3 *ja*'s and Casey produced 3 sets of 2 *ja*'s. Again, just as in Sally's case, Casey followed up a pair of *ja*'s with the verbal comment, "I don't know what else to say" (10:13). This reinforces the notion that for the language learner, laughter has a broader range of application than it does for a NS, acting as a 'make-do' pragmatic device, rather than a mere marker of solidarity.

4.5.2.2.3 Metacognition

In Session 2, there were roughly 25 intelligible think-aloud comments. There were more negative comments than in Session 5. They were, "I'm worried that I did

something wrong" (10:00), "I don't really know what to say (.) aah" (10:05), "I'm a little sleepy" (10:10) and "I don't know what else to say" (10:16). Additionally, there were positive comments, which included "I'm pretty excited (.) I (.) uh (.) don't really have anyone to speak Spanish with" (10:05) and "This is fun (laughter) I might be weird though" (10:14). These evaluative comments seemed to start on a tenser note, but end up on a more positive note. Interestingly, the first positive comment occurred after Emilia indicated that she was very happy that day, and the second positive comment occurred after Emilia mentioned that she was celebrating her wedding anniversary. It seems likely that Casey was empathetic towards Emilia and that Emilia's good humor put Casey more at ease.

Casey admitted not knowing how to say something in Spanish on three separate occasions and, on five other occasions, she indicated that she hoped she had said something correctly. Emilia's ranking of Casey's proficiency was 4 out of a possible 10 points.

4.5.3 Reading Span

Casey's reading span showed no significant pre- to post-session shifts over the course of the study. For that reason, no meaningful comparisons among sessions can be made.

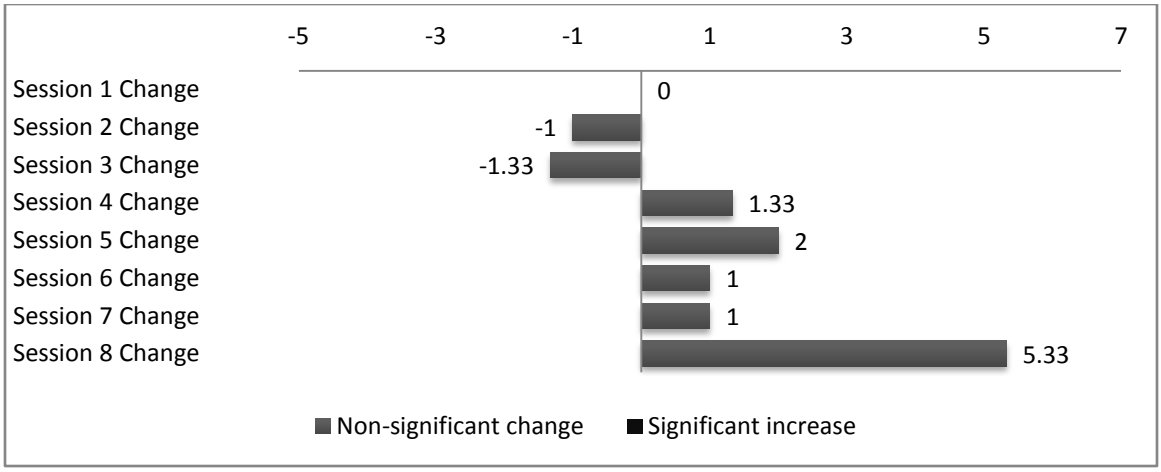

Table 14: Changes in Casey's Reading Span from pre- to post-session

4.5.4 Summary

The established association between greater numbers of LREs and downshifts in motivation and/or attitudes was apparently supported by Casey's data. Curiously, however, the association was not as strong as expected. Thus far, Casey has been the only participant to exhibit *both* a significant increase and a significant decrease in the same AMTB subscale. Comparisons among the other participants relied on significant differences between the highest and lowest pre- to post-session shifts, rather than the clearly positive and negative shifts noted in Casey's case. And yet Casey's negative shift was not accompanied by *double* the number of LREs as in Sally's case, but only one additional LRE. It may well be that the novelty of the first session was enough to mitigate the long translation requests or, likewise, it may well be that the recast was particularly salient, given that recasts are NS-initiated and not learner-initiated as were Casey's remaining LREs. It is interesting that the *only* recast appeared in Session 4, which coincided with a downward shift in motivational intensity (=AMTB Subscale 3).

The pre- to post-session shifts in the BFI items also had possible traces in the discourse. By the end of Session 5, it was evident that Casey was more at ease than she had been at the beginning. She had successfully apologized for being late, and John appeared to have no objections to waiting a few minutes for Casey to finish. Additionally, Casey was clearly delighted to discuss her upcoming trip to Argentina and was particularly interested in resolving the meaning negotiation of the word *alfajores*. Her successful meaning negotiations coupled with her enthusiasm for the only topic of discussion may have had both a calming effect and made her more open to Emilia's input.

Like Session 5, Session 2 saw a significant decrease in BFI Subscale 5 (=neuroticism), which may have been linked to the fact that Casey's negative comments occurred towards the beginning of the session, and her positive evaluative comments occurred towards the middle of the session. A progression from nervousness to calmness is directly visible in the think-aloud data. Although it is not clear what might have sparked her initial nervousness/cautiousness, Casey may well have taken cues from Emilia's good humor to become more relaxed and confident. A brief exchange concerning Casey's trip to Argentina towards the end of the interaction may have put her further at ease.

Session 2 differed from Session 5 in that Casey showed a significantly lower pre- to post session shift in her degree of openness (=BFI Subscale 2). This may well be attributable to the fact that she cut the two meaning negotiations short in an attempt to save face. Again, it appears from Casey's think-aloud data that LREs are more complex than the text-based data alone might indicate. In Session 2, Casey led Emilia to believe that the two meaning negotiation sequences had been successfully resolved, when in fact the think-aloud data revealed that they had not.

It remains to be seen if the other case studies would support any general effect for the interlocutor mood on neuroticism (=BFI Subscale 5) as well as topic interest and truncated meaning negotiations on openness (=BFI Subscale 1). For now, it is possible to say that traces of personality shifts can be found in those aspects of interaction that may affect her SLA.

4.6 HALEY

At the time of the study, Haley was a 19-year-old female. She was currently enrolled in a fifth-semester Spanish course at St. Edward's university and had previously studied Spanish for 7 semesters, pursuing a Spanish minor. She was a NS of English and spoke no other languages at home.

4.6.1 Attitudes and Motivation

Haley's mean pre- to post-session shift (0.016667 out of the 7-point Likert scale used to measure AMTB items) (see Table 15) was relatively low when compared with the other participants in this study. In fact, only Casey and John exhibited lower average shifts. Haley's standard deviation, on the other hand, was among the highest when compared with the other participants. Only Lori's and John's pre- to post-session AMTB shifts were more unpredictable. It is therefore very difficult to say whether or not these treatments had an overall positive impact on Haley's attitudes towards learning Spanish, desire to learn Spanish and motivational intensity. Still, Session 2, Subscale 3 (=motivational intensity) saw the most significant positive shift ($p= 0.0038$) of all participants reviewed thus far. The pre- to post-session shift of 2.6 points on the 7-point

Likert scale used to measure AMTB items represents a very marked shift, indeed. While there is no significant, negative shift with which to compare the significant, positive shift seen in Session 2, Session 8 presents the lowest shift in Subscale 3, which was

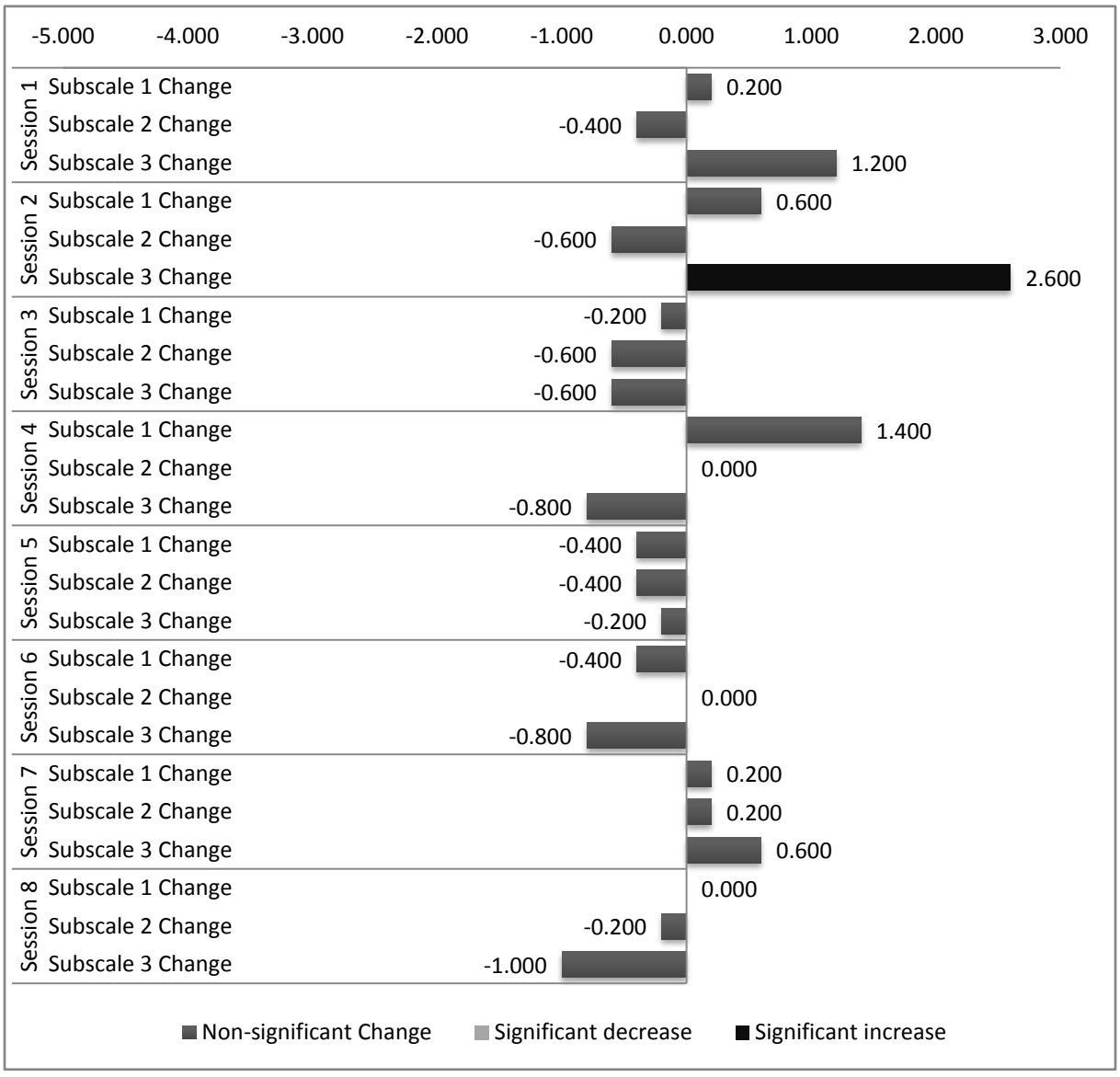

Table 15: Changes in Haley's AMTB items from pre- to post-session

significantly different than the pre- to post- session shift in the same subscale for Session 2 (p = 0.0023). It is for this reason that Sessions 2 and 8 are analyzed in the following sections.

4.6.1.1 Session 2

Again, Session 2 saw a significant pre- to post-session shift in Subscale 3 (=motivational intensity). It contained 385 words that spanned 85 entries, 38 of which were by Haley and the remaining 47 by Emilia, the interlocutor.

4.6.1.1.1 Language-related episodes

There were two non-interactive LREs that were revealed by the think-aloud data (e.g. "I'll just pretend I know what *carrera* ('degree') means" [10:09]). Additionally, there was one interactional LRE that Haley did not intend to negotiate until Emilia issued a comprehension check (see Exchange 32 below).

Exchange 32:

(1) 10:24 AM Emilia: sobre todo "calidad de tiempo"
(2) Think aloud: I'm not sure what that means ( ) we are ( ) ah ok ( )
(3) 10:25 AM Haley: o ok
(4) Think aloud: ( ) uh (.) whatever (mimicking accent)
(5) 10:25 AM Emilia: entendiste?
(6) 10:25 AM Haley: mas o menos
(7) 10:25 AM Emilia: preguntame lo que tu quieras
(8) Think aloud: ah (.) she caught me (.) funny ( ) I wonder if she's psychic
(9) 10:25 AM Haley: que es calidad?
(10) 10:25 AM Emilia: sabes que significa: tiempo
(11) 10:25 AM Haley: o si
(12) 10:25 AM Haley: ahora recuerdo
(13) 10:26 AM Emilia: calidad?
(14) Think aloud: The weather? (.) mm (.) something about the weather?
(15) 10:26 AM Haley: mmm no se
(16) Think aloud: Why can't you just tell me what it means instead of making

(17) me guess (.) I don't KNOW (.) don't make me guess something (I don't
(18) know) (.) ok (.) well (.) lady
(19) 10:27 AM Emilia: como cuando vas a la tienda de ropa y buscas algo que
(20) sea de buena "calidad"
(21) Think aloud: ( ) OH (.) quality (.) ok
(22) 10:27 AM Haley: o si
(23) 10:27 AM Haley: lo entiendo

(1) 10:24 AM Emilia: 'above all "quality time"'
(2) Think aloud: I'm not sure what that means ( ) we are ( ) ah ok ( )
(3) 10:25 AM Haley: o ok
(4) Think aloud: ( ) uh (.) whatever (mimicking accent)
(5) 10:25 AM Emilia: 'did you understand?'
(6) 10:25 AM Haley: 'more or less'
(7) 10:25 AM Emilia: 'ask me whatever you want'
(8) Think aloud: ah (.) she caught me (.) funny ( ) I wonder if she's psychic
(9) 10:25 AM Haley: 'what is quality?'
(10) 10:25 AM Emilia: 'you know what time means'
(11) 10:25 AM Haley: o 'yes'
(12) 10:25 AM Haley: 'now I remember'
(13) 10:26 AM Emilia: 'quality?'
(14) Think aloud: The weather? (.) mm (.) something about the weather?
(15) 10:26 AM Haley: mmm 'I don't know'
(16) Think aloud: Why can't you just tell me what it means instead of making
(17) me guess (.) I don't KNOW (.) don't make me guess something (I don't
(18) know) (.) ok (.) well (.) lady
(19) 10:27 AM Emilia: 'like when you go to the clothing shop and you are looking for something that'
(20) 'is good "quality"'
(21) Think aloud: ( ) OH (.) quality (.) ok
(22) 10:27 AM Haley: o 'yes'
(23) 10:27 AM Haley: 'I understand it'

Given the case studies previously analyzed, I would hypothesize that this LRE might put downward pressure on at least one motivational subscale, and while it is true that Subscale 2 had a non-significant, downward pre- to post-session shift of -0.6 (=desire to learn Spanish), it is difficult to determine what might have signaled an upward trend in Subscale 3 (=motivational intensity). The principal difference between this and other LREs analyzed was that Haley (successfully) deflected the threat to face as revealed by

her think-aloud data. She made light of her misrepresentation that she had understood *calidad* 'quality,' by saying "she caught me" in a sarcastic tone. She also put Emilia down by criticizing her meaning negotiating techniques and by calling her "lady" as a pejorative reference to her older age. She did not exhibit humility or embarrassment at not knowing a word, as Sandra and Sally were particularly apt to do, but rather indignation at Emilia for assuming the teacher role.

4.6.1.1.2 Conversation Management, Pragmatic Markers and Metacognitive Markers

What made this session stand out from all others analyzed thus far was the sarcastic and even antagonistic tone of Haley's think-aloud data. On at least three occasions during pauses in the conversation, Haley would begin humming the theme song from Jeopardy as though she was impatiently awaiting Emilia to nominate the next topic. Haley, it seems, felt very little pressure to take the floor, even during pauses that lasted as long as 3 minutes (see Exchange 33 below).

Exchange33:

(1) 10:13 AM Emilia: Aja! si ahora recuerdo. Tu familia vive en Maryland.
(2) Think aloud: Aha (.) NOW she remembers me (.) I wonder if she has
(3) Alzheimers ( ) (.) I remembered her like instantly and now she remembers
(4) me now that I've told her lots of things about me
(5) 10:13 AM Emilia: tu estas en Austin con tu hermana
(6) Think aloud: Uh: YEAH and my parents
(7) 10:13 AM Haley: si, y mis padres
(8) Think aloud: (humming Jeopardy theme song) (.) ( ) taking a while ( )
(9) maybe she's busy doing her makeup ( ) just waiting (.) wonder if she's
(10) ever going to say anything back
(11) 10:16 AM Emilia: tus padres estan en Maryland
(12) Think aloud: FINALLY
(13) 10:16 AM Haley: Mis padres son de Maryland, pero viven aqui en Austin
(14) 10:17 AM Emilia: oh, ok.
(15) 10:17 AM Emilia: Tengo mala memoria

(16) Think aloud: Yeah you DO really have a bad memory ( ) I want to ask her
(17) if she's like 90 years old
(18) 10:17 AM Haley: esta bien
(19) Think aloud: You're also really slow at typing

(1) 10:13 AM Emilia: 'Aha! yes I remember now. Your family lives in Maryland'.
(2) Think aloud: Aha (.) NOW she remembers me (.) I wonder if she has
(3) Alzheimers ( ) (.) I remembered her like instantly and now she remembers
(4) me now that I've told her lots of things about me
(5) 10:13 AM Emilia: 'you're in Austin with your sister'
(6) Think aloud: Uh: YEAH and my parents
(7) 10:13 AM Haley: 'yes, and my parents'
(8) Think aloud: (humming Jeopardy theme song) (.) ( ) taking a while ( )
(9) maybe she's busy doing her makeup ( ) just waiting (.) wonder if she's
(10) ever going to say anything back
(11) 10:16 AM Emilia: 'your parents are in Maryland'
(12) Think aloud: FINALLY
(13) 10:16 AM Haley: 'My parents are from Maryland, but now they are here in Austin'
(14) 10:17 AM Emilia: oh, ok.
(15) 10:17 AM Emilia: 'I have a bad memory'
(16) Think aloud: Yeah you DO really have a bad memory ( ) I want to ask her
(17) if she's like 90 years old
(18) 10:17 AM Haley: 'it's fine'
(19) Think aloud: You're also really slow at typing

Not only was she critical of Emilia's pace, but also of the fact that she did not remember the details of their previous conversation. When Haley said "*esta bien*" 'it's ok' at the end of the above exchange, it came across not as an attempt to establish solidarity, but as an act of forgiveness that, nonetheless, upheld Haley's sense of superiority over Emilia.

It is interesting to note that one of Haley's first comments was, "Is this the same person I talked to last time (.) I don't think so" (10:01). Contrary to Haley's claim during Exchange 33 (above) that she "instantly" remembered Emilia, there was no indication

that Haley had a better recollection of the previous conversation than Emilia. In fact, she did not recall anything about Emilia, and even asked her where she was from. This did not stop Haley, however, from indicating impatience and indignation at Emilia's failed attempts to recall Haley's personal details.

Haley did nominate one topic of conversation, although she made it clear that doing so was not her responsibility (see Exchange 34 below).

Exchange 34:

(1) 10:21 AM Emilia: no hay problema
(2) Think aloud: Maybe I: should just go ahead and ask her something (.)
(3) she's so slow
(4) 10:23 AM Haley: tiene hijos?
(5) 10:23 AM Emilia: si, dos
(6) Think aloud: Oh
(7) 10:23 AM Haley: de que edad?
(8) 10:23 AM Emilia: una nina de 9 y un nino de 4
(9) Think aloud: Oh (.) that's cute
(10) 10:23 AM Haley: no quiere mas?
(11) Think aloud: She doesn't want more kids↑ (.) I had a feeling she was older
(12) (.) she has a bad memory
(13) 10:23 AM Emilia: NOOOOOOOOOOOOO
(14) Think aloud: (laughs) Oh my GOD (.) OK calm down (.) it's all good
(15) 10:23 AM Emilia: ja,ja,ja

(1) 10:21 AM Emilia: 'no problem'
(2) Think aloud: Maybe I: should just go ahead and ask her something (.)
(3) she's so slow
(4) 10:23 AM Haley: 'do you have children?'
(5) 10:23 AM Emilia: 'yes, two'
(6) Think aloud: Oh
(7) 10:23 AM Haley: 'how old?'
(8) 10:23 AM Emilia: 'a 9-year-old daughter and a 4-year-old son'
(9) Think aloud: Oh (.) that's cute
(10) 10:23 AM Haley: 'you (2SG.FRML) want more?'
(11) Think aloud: She doesn't want more kids↑ (.) I had a feeling she was older
(12) (.) she has a bad memory
(13) 10:23 AM Emilia: NOOOOOOOOOOOOO

(14) Think aloud: (laughs) Oh my GOD (.) OK calm down (.) it's all good
(15) 10:23 AM Emilia: ja,ja,ja

Haley makes it seem as though she could have carried the conversation without much effort, but had previously held back, presumably because she had taken the role of interviewee and saw it as Emilia's responsibility to maintain the flow. It appears here as though Haley sees herself as picking up where Emilia had failed; again, a quite different sort of reaction than seen among the other participants.

Emilia produced 2 sets of 3 *ja*'s and Haley produced 2 sets of 2 *ja*'s. All of Emilia's *ja*'s appeared to be markers of solidarity, whereas only one set of Haley's appeared to indicate solidarity. The other pair, an apparent mitigator, came before an entry concerning Emilia's forgetfulness. Emilia's ranking of Haley's proficiency was 4 out of a possible 10 points.

4.6.1.2 Session 8

Session 8 is contrasted with Session 2 because it is the most significantly different in terms of pre- to post-session AMTB Subscale 3 shifts. It contained 429 words that spanned 96 entries, 46 of which were by Haley and the remaining 50 were by a different interlocutor, Roberto.

4.6.1.2.1 Language-related episodes

Session 8 saw 6 canonical LREs, as opposed to one in Session 2. There were 3 meaning negotiations, two of which were initiated by Haley, one translation request, also initiated by Haley, and 2 recasts. It is interesting that, whereas she avoided all LREs in

Session 2, she freely initiated them in Session 8. Moreover, her think-aloud data indicated less hostility and resistance toward Roberto taking the teacher role. Indeed, she appeared to take his admonitions quite seriously (see Exchange 35 below), in contrast to Session 2.

Exchange 35:

(1) 9:40 AM Haley: estoy muy excitada
(2) Think aloud: Y nerviosa ( )
(3) 9:40 AM Roberto: vives sola o con otras?
(4) 9:40 AM Haley: vivire' con mi amiga Mia
(5) Think aloud: Mi amiga Mia ((laughter)) oh my God
(6) 9:40 AM Roberto: no se dice excitada
(7) Think aloud: Don't say excitada ( )
(8) 9:41 AM Haley: que debo decir?
(9) 9:41 AM Roberto: excitada tiene una connotacion vulgar
(10) Think aloud: ((gasp)) OH MY GO:D (.) if I would have known (.) oh
(11) ((laughter))
(12) 9:41 AM Roberto: emocionada o entusiasmada
(13) 9:41 AM Haley: por dios
(14) Think aloud: ((laughter)) ((practices pronunciation of *emocionada* and
(15) *entusiasmada*))
(16) 9:41 AM Roberto: si, es como "embarazada"
(17) 9:42 AM Haley: uau, jaja
(18) Think aloud: (simultaneous laughter) (.) DAMN (.) that's (.) ok I gotta
(19) remember that (.) (I'm freaked out) that's bad (.) just like embarazada (.)
(20) (damn) (.) I've got to be careful what I say at work (.) ( ) ((laughter)) (.)
(21) O:H my God
(22) 9:42 AM Roberto: en espanol, "embarazada" quiere decir que vas a
(23) tener un bebe
(24) 9:42 AM Haley: si
(25) Think aloud: I know that (.) GOD I can't believe I said that ( ) that's so
(26) embarrassing (.) ((practices pronouncing *entusiasmada* and *emocionada*))
(27) 9:43 AM Roberto: que verguenza!
(28) 9:43 AM Roberto: ☺
(29) 9:44 AM Roberto: yo siempre cometo los mismos errores en ingles
(30) 9:44 AM Haley: jaja
(31) Think aloud: ((laughter)) how shameful ((laughter))

(1) 9:40 AM Haley: 'I am very aroused'

(2) Think aloud: 'And nervous ( )'
(3) 9:40 AM Roberto: 'do you live alone or with others?'
(4) 9:40 AM Haley: 'I will live with my friend Mia'
(5) Think aloud: 'My friend Mia' ((laughter)) oh my God
(6) 9:40 AM Roberto: 'you don't say aroused' ((recast))
(7) Think aloud: Don't say 'aroused' ( )
(8) 9:41 AM Haley: 'what should I say?'
(9) 9:41 AM Roberto: 'aroused has a vulgar connotation'
(10) Think aloud: ((gasp)) OH MY GO:D (.) if I would have known (.) oh
(11) ((laughter))
(12) 9:41 AM Roberto: 'excited or excited'
(13) 9:41 AM Haley: 'oh God'
(14) Think aloud: ((laughter)) ((practices pronunciation of *emocionada* and
(15) *entusiasmada*))
(16) 9:41 AM Roberto: 'yes, it's like "pregnant"'
(17) 9:42 AM Haley: 'wow', jaja
(18) Think aloud: (simultaneous laughter) (.) DAMN (.) that's (.) ok I gotta
(19) remember that (.) (I'm freaked out) that's bad (.) just like embarazada (.)
(20) (damn) (.) I've got to be careful what I say at work (.) ( ) ((laughter)) (.)
(21) O:H my God
(22) 9:42 AM Roberto: 'in Spanish, "pregnant" means that you're going to have a baby'
(23) 9:42 AM Haley: 'yes'
(24) Think aloud: I know that (.) GOD I can't believe I said that ( ) that's so
(25) embarrassing (.) ((practices pronouncing *entusiasmada* and *emocionada*))
(26) 9:43 AM Roberto: 'how embarrassing!'
(27) 9:43 AM Roberto: ☺
(28) 9:44 AM Roberto: 'I always make the same mistakes in English'
(29) 9:44 AM Haley: jaja
(30) Think aloud: ((laughter)) how shameful ((laughter))

Haley's reaction to Roberto's negotiation was markedly different than her previous reaction to Emilia. In fact, none of the LREs were received with any sign of resentment nor were there any apparent attempts to deflect the threats to face.

4.6.1.2.2 Conversation Management and Pragmatic Markers

The 'tone' of Haley's entries in this session was much more congenial than it had been in Session 2 with Emilia. There were no moves to put Roberto on lower footing; instead, there was laughter that coincided with recorded humorous laughter in the think-aloud data. Haley even related an embarrassing episode where she had misused the Spanish word *quitar* 'to remove' to indicate that she was 'quitting' her former job.

Haley produced three sets of two *ja*'s, one set of three *ja*'s and a pair of *ha*'s. Of these, three were apparent humorous responses and the remainder consisted of apparent markers of solidarity. Again, the use of laughter in this session stands in stark contrast to the laughter indicated in Session 2.

4.6.1.2.3 Metacognition

Other than the think-aloud comments made in conjunction with Exchange 35 above, there were 6 comments in which Haley wondered how to say something in Spanish, one self-correction and 5 other planning/monitoring comments indicating attention to form (e.g. "Do I say *mesera* or *camarera*?" [9:57]).

In the beginning of the session, she indicated that she was pleased that her partner was Roberto, by saying "a::h Rober:to:" (9:34). She also made some neutral evaluative comments, such as "here we go again" (9:34) and "last session" (9:34). Once, Haley asked Roberto how to say *to move-in* in Spanish. Roberto took roughly 30 seconds to respond, which made Haley slightly impatient, as evidenced by her comment, "took him long enough" (9:38).

One final feature that made this session stand out from Session 2 was Haley's reactions to the two longer pauses. She did not cast them as Roberto's responsibility or failure as she did with Emilia, and her comments indicated more nervousness. Once,

Haley said, “what do I say now?” (9:50), and during the other pause, she said, “say something” (9:52). This gave the impression that Haley was unable to nominate the next topic and was essentially at a loss for words. She never gave such an indication in Session 2.

Roberto’s ranking of Haley’s proficiency at the end of the session was 7 out of a possible 10 points.

4.6.2 Personality

While Haley’s mean pre- to post-session change (=0.037917) (see Table 16 below) was only slightly above average, only two other participants, John and Jessica, had greater standard deviations, meaning that Haley’s short-term BFI profile was among the more unstable/unpredictable. The only session that showed a significant ‘positive’ pre- to post-session shift was Session 5. Even though two sessions showed a significant, ‘negative’ pre- to post-session shift, the most suitable contrast for Session 5 is Session 2, for two reasons: (1) Session 5 revealed a significant upswing in Subscale 1 (=openness), while Session 2 showed the greatest negative shift in the same subscale; and (2) Session 2 presented a significant downswing in Subscale 2 (=conscientiousness), while Session 5 revealed the third highest upswing in the same subscale. In all cases, the difference between the shifts of Subscales 1 ($p = 0.0083$) and 2 ($p = 0.0035$) are highly significant.

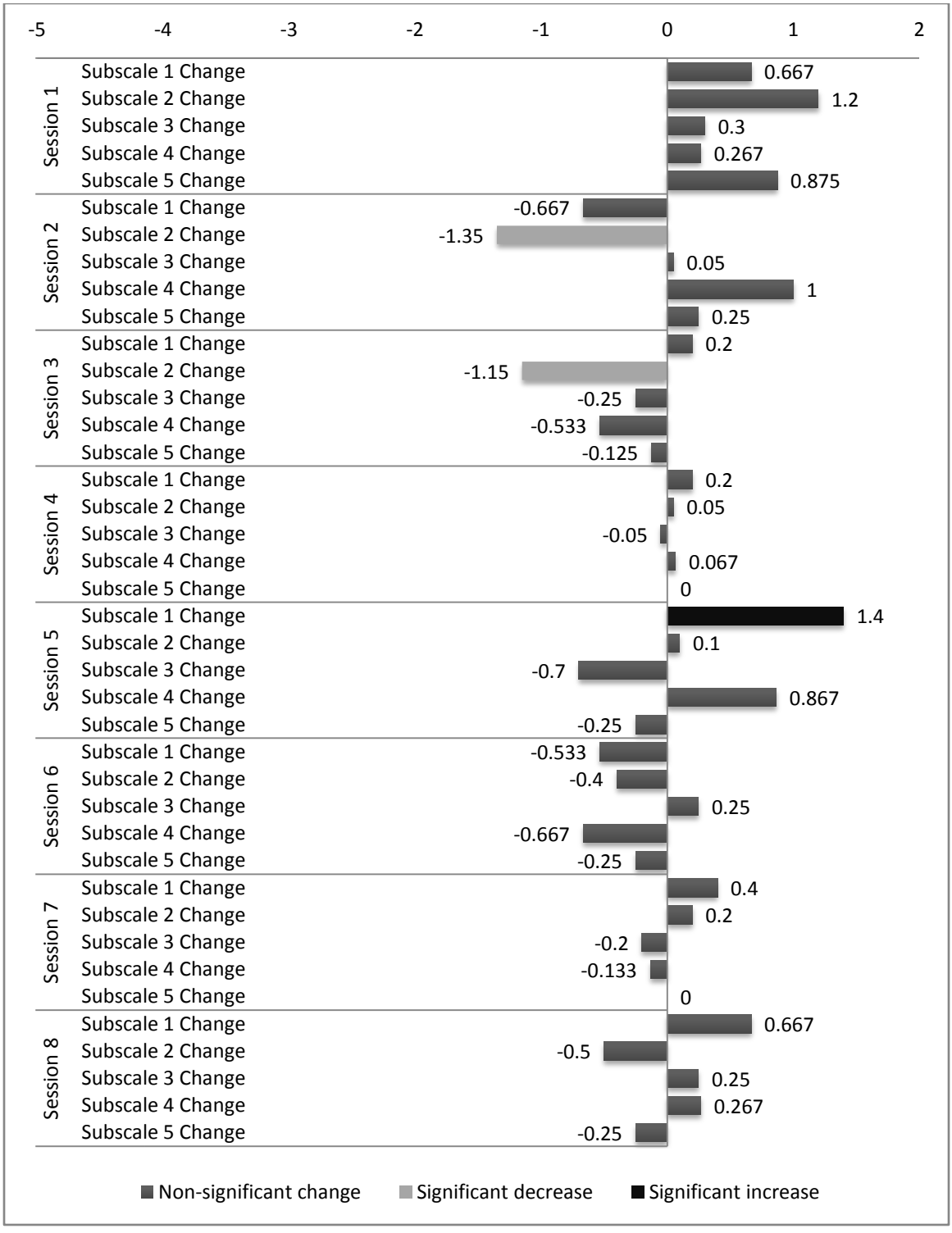

Table 16: Changes in Haley's BFI items from pre- to post-session

4.6.2.1 Session 5

Again, Session 5 presented a 'positive' pre- to post-session shift in Subscales 1 and 2, while Session 2 revealed a 'negative' shift in the same subscales. Session 2 was analyzed in Section 4.6.1.1, and Session 5 is analyzed in this section. It contained 416 words that spanned 88 entries, 46 of which were by Haley and the remaining 42 by Emilia, the interlocutor.

4.6.2.1.1 Language-related episodes

There were three LREs in Session 5. The first was a clarification request, initiated by Haley, the second was a recast, and the third was a translation request, again initiated by Haley. It is worth briefly noting that the number of canonical recasts lies between those in Sessions 2 and 8. As would be expected, the pre- to post-session shift in AMTB Subscale 3 also falls between those of Sessions 2 and 8. None of the LREs exceeded 3 TCUs and none of them were responded to with any hostile think-aloud comments by Haley, as was the case in Session 2.

Even though Haley initiated two LREs, she avoided initiating at least 3 others. Typically, Haley would indicate to Emilia that she had understood one of her entries, while her comments in the think-aloud indicated that, in fact, she had not.

4.6.2.1.2 Conversation Management and Pragmatic Markers

Haley's frustration and hostility towards Emilia was far less apparent in this session than in Session 2. In both sessions, Haley asked Emilia how many children she had, and Emilia's answers were quite similar. Haley's reactions, however, were quite

different, both in the text-based and think-aloud data. Compare Exchange 33from Session 2 with Exchange 36 below.

Exchange 36:

(1) 10:12 AM Haley: usted tiene dos hijos, si?
(2) Think aloud: she has two children
(3) 10:13 AM Emilia: si, (Viviana) 9 y (Miguel) 4
(4) 10:13 AM Haley: no va a tener mas?
(5) Think aloud: Valeria ( ) I've never heard of that ((practices pronouncing
(6) *Valeria*)) I guess it's like (Vivian)
(7) 10:13 AM Emilia: NOOOO!!!!!
(8) Think aloud: ((reading response)) NO: ((laughter)) oh my God
(9) ((laughter))
(10) 10:13 AM Emilia: ja,ja,ja
(11) 10:13 AM Haley: hahah
(12) Think aloud: ((laughter))
(13) 10:13 AM Haley: usted es muy comica
(14) 10:14 AM Haley: porque?
(15) Think aloud: That's funny
(16) 10:14 AM Emilia: ja,ja, gracias
(17) Think aloud: she does NOT want more children

(1) 10:12 AM Haley: 'you have two children, right?'
(2) Think aloud: she has two children
(3) 10:13 AM Emilia: 'yes, (Viviana) 9 and (Miguel) 4'
(4) 10:13 AM Haley: 'you're not going to have any more?'
(5) Think aloud: Valeria ( ) I've never heard of that ((practices pronouncing
(6) *Valeria*)) I guess it's like (Vivian)
(7) 10:13 AM Emilia: NOOOO!!!!!
(8) Think aloud: ((reading response)) NO: ((laughter)) oh my God
(9) ((laughter))
(10) 10:13 AM Emilia: ja,ja,ja
(11) 10:13 AM Haley: hahah
(12) Think aloud: ((laughter))
(13) 10:13 AM Haley: 'you're very funny'
(14) 10:14 AM Haley: 'why?'
(15) Think aloud: That's funny
(16) 10:14 AM Emilia: ja,ja, 'thank you'
(17) Think aloud: she does NOT want more children

Absent from the think aloud data in this exchange were negative comments concerning Emilia's age and her poor memory, as well as an admonition to "calm down" after Emilia emphatically answered "NOOOO!!!!!" as were noted in Session 2. Also, for the first time in any of the interactions, Haley paid Emilia a compliment by telling her that she was funny. The think aloud data indicates that this statement was meant sincerely.

Similar to Session 2, Emilia produced one set of 2 and 2 sets of 2 *ja*'s and Haley produced one set of 3 and one pair of *ha*'s. What was different was that all of the laughter appeared to indicate solidarity in this session. Moreover, in addition to the laughter, which is present in nearly every session, Haley made several other alignment moves, including "aww" (10:12), "*que lindo*" 'how cute' (10:12), "*uau!*" 'wow' (10:20), "*que loco*" 'how crazy' (10:20), "*o. que bueno!*" 'oh, how nice' (10:23), and "*si que buen*" 'yes, how (nice)' (10:26). It appears that Haley, being in the fifth semester of the Spanish sequence and working with Spanish speakers, has developed a more extensive repertoire of pragmatic markers.

During one protracted pause, Haley responded "hm: well if she (doesn't type) I'll just type (.) I'll just ask her ( )" (10:08). During another pause (10:19), she repeatedly demanded that she "talk." The way Haley handled what she perceived to be protracted pauses had elements of both Sessions 2 and 8 (previously analyzed). As in Session 2, Haley indicated that she would nominate a topic only because Emilia had failed to do so. As in Session 8, during the second pause, Haley indicated a little more distress and failed to nominate another topic, despite the fact that she had (effortlessly) done so earlier.

4.6.2.1.3 Metacognition

Haley made 6 think-aloud planning/monitoring comments indicating that she was unsure how to say something in Spanish, 4 evaluative comments indicating a lack of understanding, one monitoring/evaluative comment suggesting that she noticed (and understood) a phrase that she had never seen before, and 6 monitoring/evaluative comments indicating impatience at the slowness of Emilia's responses. None of the comments involved any insults more severe than "she types slow" (10:06), for example.

One final element that made this Session stand out from the others analyzed was that Haley dedicated much of her think-aloud commentary to the topic of discussion, rather than linguistic issues. Indeed, 11 out of the total 27 intelligible comments were non-metalinguistic.

4.6.3 Reading Span

Haley's pre- to post-session changes in reading span reveal no significant shifts. Therefore, any comparisons between sessions would be entirely speculative.

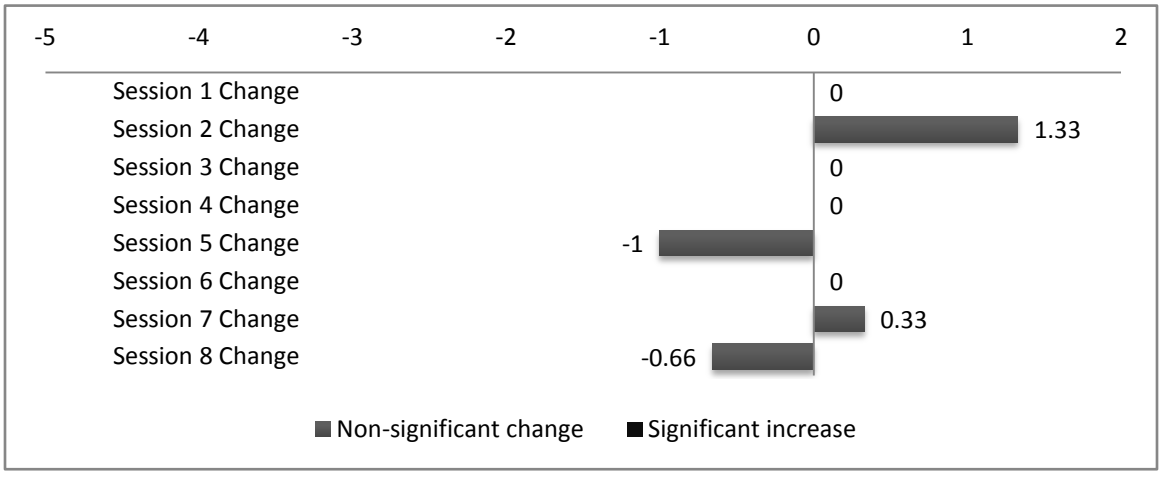

Table 17: Changes in Haley's Reading Span from pre- to post-session

4.6.4 Summary

Session 2 showed how the think-aloud protocol can help amplify subtle conversational moves. It was clear from the text data that Haley believed the burden of carrying the conversation rested squarely on Emilia's shoulders by maintaining silence during long pauses and nominating only one topic. Moreover, when Emilia was clearly struggling to remember Haley's personal details and apologizing for her poor memory, Haley did not offer any show of support or understanding, but merely forgiveness. These moves served to place Emilia on a lower footing and they were reflected in the think-aloud data in which Haley repeatedly insulted Emilia for being slow and forgetful. Haley did not accept Emilia's invitation to initiate an LRE (see Exchange 32 Section 4.6.1.1.1); to do so would have been an act of submission. She did not even accept Emilia's feedback, but instead used sarcasm as though to deflect the feedback and reassure herself (and perhaps the researcher) of her superior status.

It seems that Haley's sense of superiority over Emilia, as indicated by her conversational moves and her think-aloud data, combined with her displacement of responsibility for carrying the conversation, were the defining features of Session 2, and possibly propelled her motivational intensity by the end of the session.

The complex nature of LREs is further revealed by Haley's data. In Session 2, there was a marked and protracted meaning negotiation, which apparently did not affect Haley because she successfully deflected what she apparently perceived as a face threat through sarcasm and insults issued in the think-aloud protocol. It may well be that such LREs do have a demotivating effect, but that such an effect can be counteracted by self-confidence; in this case apparently driven by what Haley believed to be Emilia's incompetence. Not only did Session 8 have a six-fold increase in LREs over Session 2,

but Haley initiated many of them and took the resulting input much more seriously. Indeed, she was particularly embarrassed for using the word *excitada* '(sexually) excited' inappropriately and went to great lengths to practice saying *emocionada* and *entusiasmada* 'excited' and to remind herself not to use *excitada* again. Just as it was surprising that the single LRE in Session 2 did not dampen the significant, positive shift in Subscale 3, so, too, is it surprising that such a marked LRE in Session 8 did not cause a negative pre- to post-session shift in Subscale 2 to reach a level of significance. It appears that Haley has a much higher tolerance for LREs than do the other participants, which makes it difficult if not impossible to establish any generalizable threshold for LREs. For now, it appears that the participants weigh their desire to save face against their desire to learn through LREs. More LREs than usual appear to coincide with downward trends in one or more AMTB subscales, while fewer LREs than usual appear to coincide with upward trends in one or more AMTB subscales.

The desire to save face – that is, the degree to which a learner resists being vulnerable to NS superiority that usually was displayed in the NS/non-NS dyad frame evoked by this treatment – marks another affective dimension not often treated in SLA literature. Here, Haley made several moves, overtly and through the think-aloud protocol, to keep Emilia on an equal or lower footing than herself. Her success in this endeavor may well have propelled her motivational intensity upward as might have any perceived victory. It did not, however, appear to give her any greater desire to learn Spanish (=AMTB Subscale 2) nor any improved attitudes towards learning Spanish (=AMTB Subscale 1).

Concerning Haley's personality profile, it appears that increased levels of openness, which indicates greater inventiveness/curiousness, and increased levels of conscientiousness, which suggests greater levels of efficiency/organization, coincide with

greater numbers of learner-initiated LREs as well as less antagonism towards the NS interlocutor. This result makes sense intuitively, at least with respect to Haley's level of openness (=BFI Subscale 1), because less antagonism would allow Haley to express her curiosity more freely in the form of learner-initiated LREs, which might, in turn, reinforce her self-perception as being increasingly open.

4.7 JESSICA

At the time of the study, Jessica was a 19-year-old female. She was currently enrolled in a second-semester Spanish course at St. Edward's university and had previously studied Spanish for 2 semesters. She was a NS of English and spoke no other languages at home.

4.7.1 Attitudes and Motivation

Jessica was tied for the second-highest average positive pre- to post-session shift in AMTB test items. Her average post-session response was 0.075 points higher than her corresponding pre-session response on the 7-point Likert scale used to measure AMTB items (see Table 18 below). Only Sally experienced a higher average shift. Jessica's standard deviation was just below the median when compared with the other participants, indicating that her AMTB shifts were slightly more predictable than those of the other participants. It could be said that the treatments were generally positively motivating for Jessica, not only because her average pre- to post-session shift was positive, but also because the only significant pre- to post-session shifts were positive. Session 1 showed a positive shift of 1.2 in Subscale 2 (=desire to learn Spanish) ($p=0.0287$) and Session 3 revealed an even more significant jump of 1.4 in Subscale 1 (=attitudes towards learning

Spanish). There were no significant, negative shifts with which to contrast those seen in Sessions 1 and 3. Moreover, there were no negative shifts whatsoever in Subscale 1, making it particularly difficult to find a point of contrast to the positive shift seen in Session 3. Perhaps the best points of comparison are the significant, positive shifts in

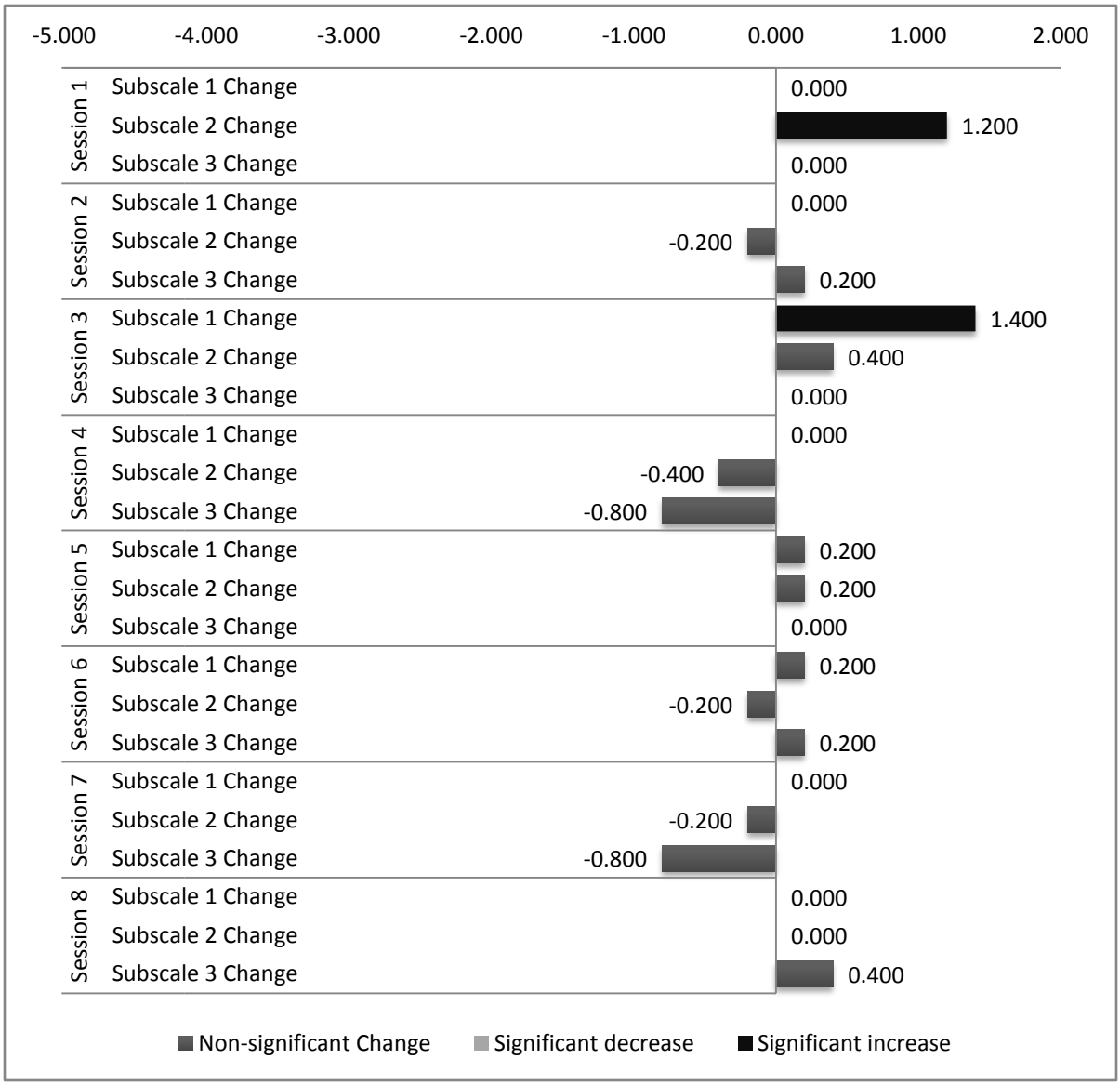

Table 18: Changes in Jessica's AMTB items from pre- to post-session

Session 1, Subscale 2, and the negative (-0.4), non-significant shift in Session 4, Subscale 2. The difference between the two points is significant ($p = 0.0140$); indeed, it is the greatest and most significant difference between any two points.

4.7.1.1 Session 1

Session 1 lasted 27 minutes. It contained 404 words that spanned 76 entries, of which 29 were uttered by Jessica, and the remaining 47 by Emilia, the interlocutor.

4.7.1.1.1 Language-related episodes

In all, there were 7 interactional LREs: one clarification request, 2 meaning negotiations, 2 recasts and 2 translation requests. Most were resolved within 2 or 3 TCUs, although two in particular were rather protracted (see 37 below, for example).

Exchange 37:

(1) 8:44 AM Emilia: te felicito, me parece muy bien.
(2) 8:44 AM Jessica: como se dice "parace" en ingles?
(3) 8:45 AM Emilia: looks
(4) 8:45 AM Emilia: me parece que va a llover
(5) 8:46 AM Jessica: Hace sol aqui. Donde vives?
(6) 8:46 AM Emilia: me parece que vas aprender rapido espanol
(7) 8:46 AM Emilia: vivo en Connecticut, pero soy de Lima-Peru
(8) 8:47 AM Jessica: Como largo vives en connecticut?

(1) 8:44 AM Emilia: ‘congratulations, that seems great’.
(2) 8:44 AM Jessica: ‘how do you day “that seems” in English?’
(3) 8:45 AM Emilia: looks ((inaccurate translation))
(4) 8:45 AM Emilia: ‘it seems like it’s going to rain’
(5) 8:46 AM Jessica: ‘It’s sunny here. Where do you live?’
(6) 8:46 AM Emilia: ‘it seems to me that you’re going to learn Spanish quickly’
(7) 8:46 AM Emilia: ‘I live in Connecticut, but I’m from Lima, Peru’

(8) 8:47 AM Jessica: ‘how long are you living in Connecticut?’

Often the concern is whether or not the LRE interrupts the flow of communication. In this case, it appears as though the relatively rapid flow of communication interrupted the LRE. Indeed, much of the conversation appeared to be rushed by Jessica. She was especially quick to nominate topics, which sparked 4 of the 7 LREs.

4.7.1.1.2 Conversation Management and Pragmatic Markers

Compared to the other participants, Jessica seemed very upbeat and outgoing during this session. Despite being only in second-semester Spanish, she nominated more topics than any other participant during their first session; indeed, even more than students in more advanced classes. In all, Emilia nominated 3 topics and Jessica nominated 6.

By this session, Emilia had become accustomed to controlling the conversations. At several points, it seemed as though Jessica’s determination to steer the conversation was greater than her ability to quickly formulate questions. At times, as in Exchange 38, Jessica did not abandon a topic nomination even if Emilia was able to initiate an exchange more quickly.

Exchange 38:

(1) 8:37 AM Emilia: te gusta la psicologia?
(2) 8:38 AM Jessica: es que tu profesion?
(3) 8:38 AM Emilia: Cual es mi profesion actualmente? o
(4) 8:38 AM Emilia: a que me dedico actualmente?
(5) 8:39 AM Jessica: No se "dedico" en ingles. Pero si, cual es tu
(6) profesion actualmente?
(7) 8:40 AM Emilia: A que te dedicas, es como preguntar:
(8) 8:40 AM Emilia: que clase de oficio o trabajo haces?

(9) 8:40 AM Jessica: A que te dedicas?
(10) 8:40 AM Emilia: Chef personal
(11) 8:40 AM Emilia: Chef privado
(12) 8:41 AM Jessica: Tu pregunta es si yo trabajo?
(13) 8:42 AM Emilia: no, si estabas a gusto estudiando Psicologia?

(1) 8:37 AM Emilia: 'do you like psychology?'
(2) 8:38 AM Jessica: 'what is your profession?'
(3) 8:38 AM Emilia: 'What is my profession currently? or'
(4) 8:38 AM Emilia: 'what do I do currently?' ((recast))
(5) 8:39 AM Jessica: 'I don't know "*dedico*" in English. But yes, what is your'
(6) 'profession currently?'
(7) 8:40 AM Emilia: 'What do you do, is like asking:'
(8) 8:40 AM Emilia: 'what type of work do you do?'
(9) 8:40 AM Jessica: 'What do you do?'
(10) 8:40 AM Emilia: 'Personal chef'
(11) 8:40 AM Emilia: 'Private chef'
(12) 8:41 AM Jessica: 'You're asking if I work?'
(13) 8:42 AM Emilia: 'no, if you were content studying Psychology?'

Despite a few awkward overlaps, the conversation did not appear to be a struggle for control, but rather a reflection of Jessica's enthusiasm coupled with Emilia's prior experiences with more reticent participants. Jessica's think-aloud comments support the notion that she did not view Emilia as domineering. Towards the end of the session, she noted: "so far it's (.) it hasn't been bad (.) I haven't needed my dictionary at all (.) I mean there are a few words where I'm like oh what is this (.) but she could answer and tell me what they mean so it hasn't been bad" (8:50). Just as Haley used sarcasm to deflect any potential threats to face, it appears that Jessica has used optimism to the same end. Note that Jessica's evaluation is not entirely accurate (she made no mention of the recasts nor the protracted meaning negotiations, for example), but perhaps it served the purpose of promoting her desire to learn Spanish (=AMTB Subscale 2).

There were no *ja*'s in this session, but Jessica was apt to try other markers of solidarity, even ones that she could not produce in a target-like manner (e.g. "*tiene un buen dia*" [8:56] 'have a good day').

4.7.1.1.3 Metacognition

Jessica produced some 45 intelligible comments in the think-aloud protocol, more than any other participant thus far. Because there were so many comments in this one session, perhaps it would be worthwhile to do a more careful taxonomy of the think-aloud data at this point.

The vast majority of the comments were metalinguistic in nature. They included, in order of most prevalent: innumerable comments indicating monitoring (e.g. reading aloud and simultaneous translation) and planning (e.g. comments such as "uh" and "no" and speaking before typing, which were particularly difficult to tally because many of them were unintelligible); 9 comments indicating difficulty in understanding (e.g. "OK (.) I understand fast Spanish (.) but what else is this?" [8:46]); 6 comments indicating not knowing how to say something in Spanish (e.g. "I don't know how to say moved" [8:50]); 6 comments questioning output (e.g. "I don't know if that works" [8:54]); and 3 comments self-correcting or confirming that something was wrong, usually the result of LREs (e.g. "I guess I didn't put something correct" [8:35]). Additionally, there were 5 situational comments (e.g. "I DO not like my microphone" [8:30]) and 16 meta-conversational comments, such as "I wonder if she can speak English (.) she has to (.) she lives in Connecticut" (8:49), "I wonder if she has kids and stuff" (8:51) and "how does she know I live in Texas?" (8:51). It is difficult to say to what extent the meta-conversational comments could be confounded with (meta-linguistic) planning

comments, because such comments are a necessary component of the topic-nomination process, and because such comments were often followed by a text entry formulating the same question in Spanish. Suffice it to say, however, that the vast majority of the think-aloud for all participants was linguistically motivated, most of the intelligible comments involved evaluative elements (see Section 2.3.3 for additional discussion on this point) and, generally speaking, relatively few of the metalinguistic comments were motivated by LREs. Indeed, many of the comments that indicate trouble understanding, not knowing how to say something or questioning output are *not* followed by a learner-initiated LRE. This fact in and of itself offers evidence that learners prefer to avoid LREs if possible. Recall that there were 21 such comments in Jessica's think-aloud data, and yet she initiated only 5 LREs.

4.7.1.2 Session 4

Session 4 was contrastively analyzed against Session 1 because it yielded the most significantly different pre- to post-session shift when compared to the significant, positive shifts seen in Sessions 1 and 3. Session 4 lasted 29 minutes. It contained 423 words that spanned 81 entries, of which 35 were by Jessica, and the remaining 46 were by Emilia, the interlocutor.

4.7.1.2.1 Language-related episodes

Session 4 contained 8 interactional LREs: 2 meaning negotiations, 3 recasts and 3 translation requests, all of which were resolved within 4 TCUs. Recall that Session 1 contained 7 LREs, just one fewer than Session 4. Thus, Jessica's data offer only very weak support for the hypothesis that more LREs tend to signal a negative short-term shift

in one or more AMTB subscales. What was so interesting about Session 1 was that most of its LREs resulted from Jessica's risky attempts to control the conversation. In other words, LREs most often coincided with a (complex) topic nomination. In Session 4, only one LRE coincided with a topic nomination. Half of the LREs occurred during a complex discussion on violence in Latin America.

4.7.1.2.2 Conversation Management and Pragmatic Markers

Jessica nominated 2 topics, while Emilia nominated 3. The one topic that dominated in 16 minutes of the discussion involved summer plans, nominated by Jessica. Jessica explained that she was excited about her summer plans to study in Valle de Bravo, Mexico, but worried that the program might be cancelled due to the drug wars that have gripped the country. Emilia related her experiences growing up in Lima, Peru, which was also prone to crime and terrorism, especially when the Shining Path guerilla organization was most active. Understandably, the incidence of laughter was sparse during this conversation. Emilia produced only one set of 3 *ja*'s and Jessica produced one pair of *ja*'s. However, the willingness to expose fears and negative, personal experiences could be seen as an alignment move, although rare, in and of itself. Other backchanneling/alignment markers, such as *wow*, *uau* 'wow', and *que pena* 'what a shame' were produced more frequently than normal.

4.7.1.2.3 Metacognition

The think-aloud data in Session 4 had a quality and distribution similar to that of Session 1. There were 39 intelligible comments. Of these, 10 comments indicated difficulty in understanding (e.g. "what is *sendero luminoso* (.) luminous?" [8:51]), 9

comments indicated not knowing how to say something in Spanish (e.g. “um (.) summer (.) summer” [8:37]), 3 comments questioned output (e.g. “I hope she understands me” [8:34]), and 2 comments indicated self-correction or confirmation that something was wrong (e.g. “ok (.) well (.) that was TOTALLY wrong” [8:47]). Additionally, there were 2 situational comments (e.g. “I know I always say I’m tired, but I really am today” [8:29]) and 13 meta-conversational comments, such as “so she’s telling me how it was growing up in Lima (.) and it’s not at all like San Antonio” (8:53).

4.7.2 Personality

Jessica’s average pre- to post- session shifts in her BFI profiles was 0.023542 (see Table 19 below) of the 5-point Likert scale used to measure BFI items, roughly at the median compared with the other participants. Her standard deviation (0.703954), on the other hand, was higher than normal. Only John’s BFI pre- to post-session standard deviation was higher. Session 2 presents a particularly interesting case in that it saw both a highly significant, negative shift in Subscale 3 (=extroversion) coupled with a significant, positive shift in Subscale 4 (=agreeableness). Perhaps the most favorable point of comparison would be Session 1, which also saw a significant, positive increase in Subscale 4 and a significantly different pre- to post-session shift in Subscale 3 ($p=0.0072$). What might have triggered a significant shift in both sessions, but a highly significant, negative shift only in Session 2?

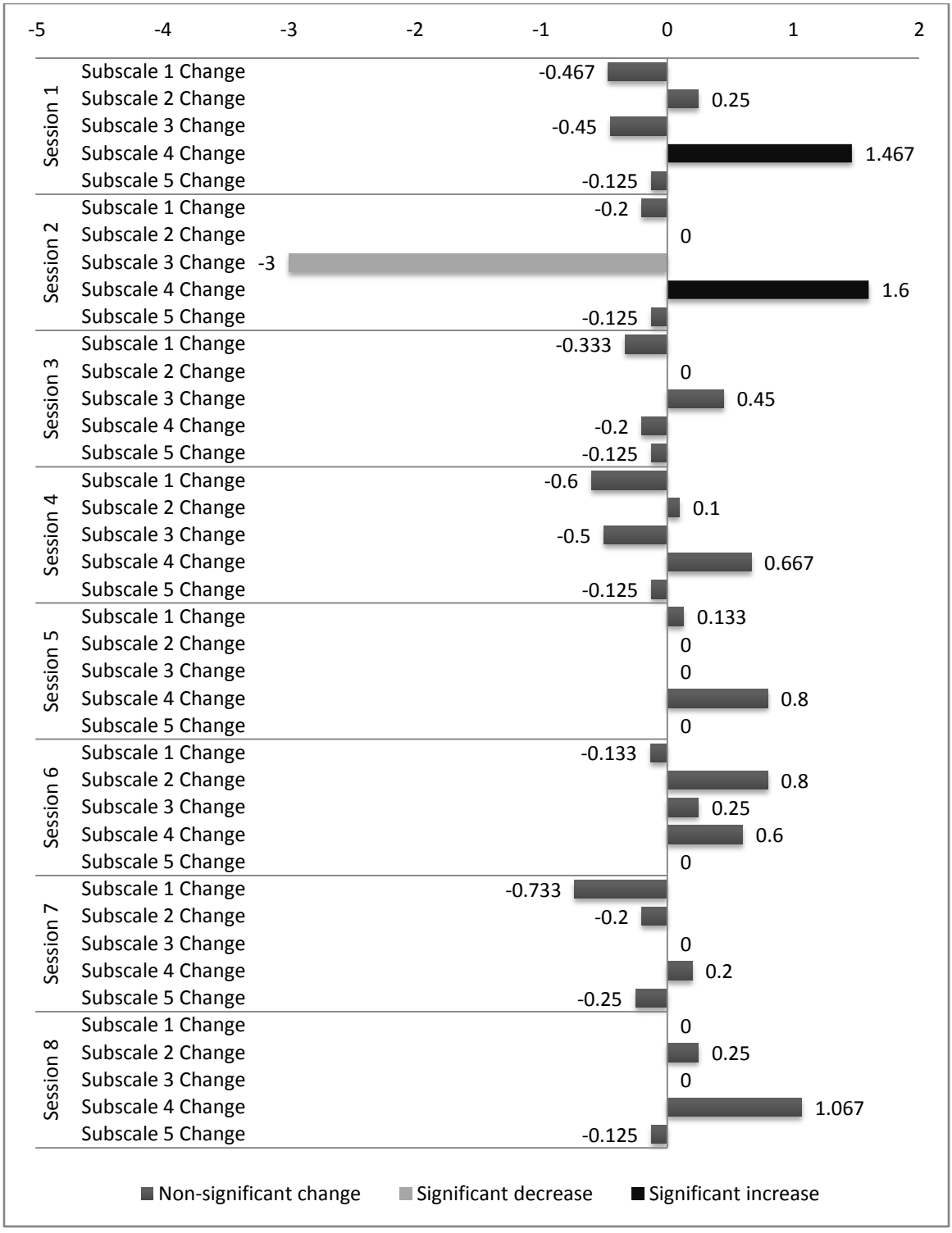

Table 19: Changes in Jessica's BFI items from pre- to post-session

4.7.2.1 Session 2

Again, Session 2 was compared against Session 1 (previously analyzed in Section 4.7.1.1). It lasted 9 minutes and contained 52 words that spanned 21 entries, of which 7 were by Jessica, and the remaining 13 by Emilia. Session 4 was impeded by technical issues. It is unclear whether Emilia's Internet connection or the web conferencing program was experiencing interruptions, but Emilia was unable to join the discussion for the first 18 minutes. One minute after she joined, she dropped out again and then rejoined and was able to communicate with Jessica for 9 minutes.

4.7.2.1.1 Language-related episodes, conversation management & pragmatic markers, and metacognition

While she was waiting, Jessica made several neutral comments that did not indicate excessive frustration or impatience, such as "I don't really know what to talk about since she's not on here" (8:32), "ok (.) it's been about 20 minutes, and I don't think she's going to show up (.) I'm about to sign off because I'm done drawing my pretty picture (.) I don't know if that gets recorded" (8:46). In this comment, Jessica was reflecting on the drawing she had been doing on the whiteboard while waiting. Shortly afterwards, Emilia joined the conversation and explained her difficulties. Most of the conversation was dominated by Emilia explaining her technical issues and complaining (see Exchange 39 below).

Exchange 39:

(1) 8:47 AM Emilia: (Jessica) estas alli?
(2) 8:47 AM Jessica: si!
(3) Think aloud: THERE she is

(4) 8:48 AM Emilia: por fin logre entrar en sesion! ni sabes cuantos
(5) problemas he tenido con la conexion
(6) 8:48 AM Emilia: detesto cuando esto pasa

(1) 8:47 AM Emilia: '(Jessica) are you there?'
(2) 8:47 AM Jessica: 'yes!'
(3) Think aloud: THERE she is
(4) 8:48 AM Emilia: 'finally I was able to enter the session! you have no idea how many'
(5) 'problems I have had with the connection'
(6) 8:48 AM Emilia: 'I hate it when this happens'

Emilia's rather aggressive entry was nothing like the apology she issued in Sandra's sixth session, which effectively elevated Sandra's status relative to Emilia's. Here, Emilia maintained equal footing by blaming her connection, thereby deflecting the responsibility for her late entry. In Sandra's case, as in Jessica's case, the protracted wait, combined with confirmation that they were not at fault and acceptance of Emilia's apology/excuse possibly signaled a significant, positive pre- to post-session shift in Subscale 4 (=agreeableness). It is likely that pragmatic weight of the apology/excuse had a substantial impact on the participants, as they are not normally a feature of the NS-NNS interview frame. There was no laughter, but neither were there any markers of rejection in this short interaction. Emilia's final ranking of Jessica's proficiency was 4 out of a possible 10 points.

4.7.3 Reading Span

Jessica's pre- to post-session changes in reading span reveal no significant shifts. Therefore, any comparisons between sessions would be entirely speculative.

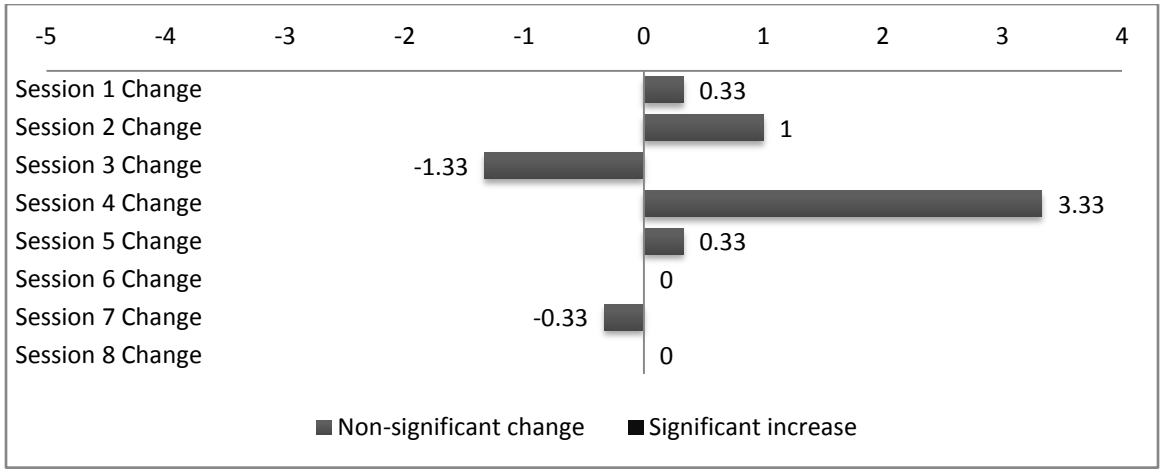

Table 20: Changes in Jessica's Reading Span from pre- to post-session

4.7.4 Summary

Session 1 illustrated that the majority of the think-aloud, even in Jessica's case, is metalinguistic. Moreover, more metalinguistic comments are devoted to grammatical/lexical issues than pragmatic issues. Of course, a task effect would be unavoidable in a 'language acquisition' study, even despite repeated instructions both at the beginning of the study and at the beginning of each session (see Appendix A1) specifically giving the participants license to include anything that came to mind in the think-aloud protocol. This finding helps justify the use of such data as a locus of language learning for the purposes of this study.

It would be premature to make any specific claims as to whether participants are more preoccupied with the dynamics of conversation, alignment with the NS, or the structure of the language during the sessions. However, I do believe that it is becoming clear in all the data that all three forces are active, perhaps simultaneously, within the sessions, which explains how, for example, LREs might influence attitudes and

motivation. It may be, for example, that fewer LREs result in smooth conversational flow (=dynamics of conversation), which in turn serves as an online sign to the learner that they have (successfully) managed the structure of the language. In so doing, they align themselves with the NS. Such a successful outcome might, in turn, encourage a learner to seize future communication opportunities.

It would also be premature to prescribe that LREs be avoided at all costs. However, it appears that, at least in the short-term, when NSs emphasize their oppositional role as teacher, a learner may well interpret such a move as a threat to face and experience a decrease in motivation and/or less favorable attitudes towards the learning situation.

Personality indicators, but not necessarily attitudes/motivation, may be susceptible to NS apologies/excuses and major deviations from routines and learner expectations. This proposal was illustrated in Sandra's sixth session and in Jessica's second session. In both cases, the participants were made to wait an unusually long time for Emilia to enter the session, and then had to deal with an unusual speech act. Both responded favorably (or at least *not* unfavorably) and showed a subsequent, significant upswing in their (perceived) levels of agreeableness. Precursors to Jessica's highly significant, negative shift in Subscale 3 (=extroversion) are not as obvious. The most notable difference between Sessions 1 and 2 was that Jessica nominated 6 topics in Session 1, but none in Session 2. The text data in Session 2 showed none of the signs of extroversion that Session 1 had. Even though there were extenuating circumstances, they may not have been enough to counteract the lack of topic nominations. It remains to be seen if this is a general or idiosyncratic tendency.

4.8 ERIN

At the time of the study, Erin was a 40 year-old female. She was currently enrolled in a sixth-semester Spanish course at St. Edward's university and had previously studied Spanish for 5 semesters, pursuing a Spanish minor. She was a NS of English and spoke no other languages at home.

4.8.1 Attitudes and Motivation

Erin's mean pre- to post-session shift of 0.075 (see Table 21 below) out of the 7-point Likert scale used to measure AMTB items was among the highest: Jessica showed the same average shift, but only Sally's was higher. Moreover, Erin's standard deviation (0.287795) was the lowest, which, when combined with the fact that her only significant pre- to post-session shift was positive, suggests that the treatments elicited a consistent, positive impact on her attitudes and motivation. Erin experienced a highly significant, positive pre- to post-session shift ($p=0.0039$) in Subscale 3 (=motivational intensity) of Session 4. There were no significant, negative shifts; however, Subscale 3 of Session 7 did show a negative shift of -0.4, which was significantly different from Session 3's shift ($p = 0.0011$). For that reason, the two sessions are contrasted in the following sections.

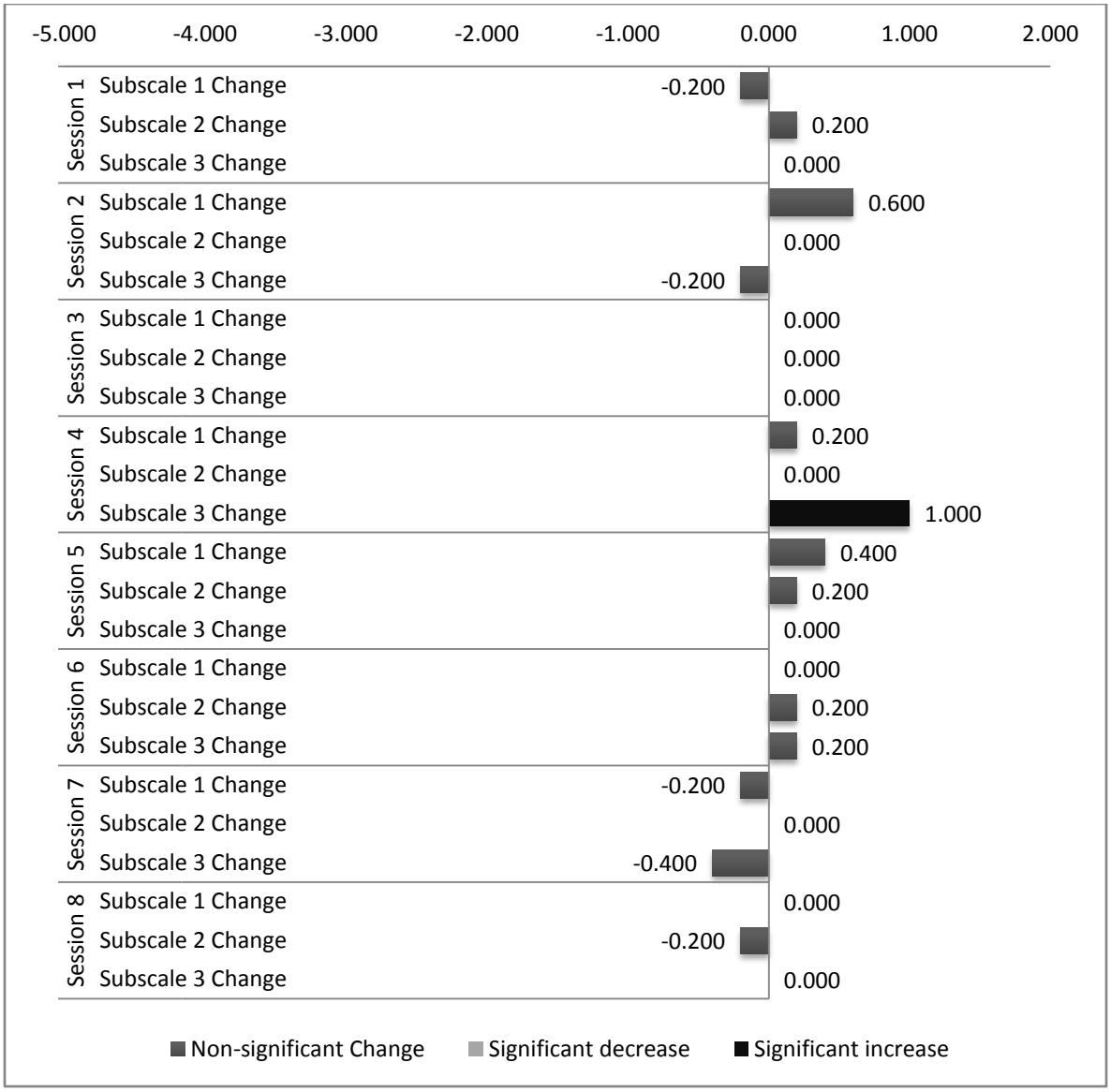

Table 21: Changes in Erin's AMTB items from pre- to post-session

4.8.1.1 Session 4

Session 4 lasted 28 minutes and contained 892 words that spanned 84 entries, 38 of which were expressed by Erin and the remaining 46 by Emilia.

4.8.1.1.1 Language-related episodes

There were 6 LREs in Session 4, of which 3 were meaning negotiations and 3 were translation requests. All of the LREs were initiated by Erin and all were resolved within 3 TCUs. There was substantial evidence that Erin did not view LREs as face-threatening episodes. Instead, she saw the chat sessions as opportunities to use Emilia as a resource. Erin initiated nearly all of the LREs in her sessions; so many, in fact, that Emilia ignored many of them (see, for example Exchange 43 in Section 4.8.2.1.1 below). On several occasions, Erin expressed her gratitude for Emilia's help, as in Exchange 40 below.

Exchange 40:

(1) 10:36 AM Erin: como se dice for some reason?
(2) 10:36 AM Emilia: por alguna razon
(3) Think aloud: good (.) I use that all the time in English and always
(4) wondered how to say it in Spanish
(5) 10:37 AM Erin: Gracias! Estoy aprendiendo mucho!
(6) 10:37 AM Emilia: de nada

(1) 10:36 AM Erin: 'how do you say' for some reason?
(2) 10:36 AM Emilia: 'for some reason' ((translation))
(3) Think aloud: good (.) I use that all the time in English and always
(4) wondered how to say it in Spanish
(5) 10:37 AM Erin: 'Thanks! I'm learning a lot!'
(6) 10:37 AM Emilia: 'you're welcome'

Erin's expression of gratitude in conjunction with LREs was not limited to this session, but was repeated throughout the sessions (see, for example apology discussed in Session 4.8.4, below).

Exchange 41:

(1) 10:45 AM Erin: va a estar o estara
(2) 10:46 AM Emilia: estara
(3) 10:46 AM Erin: gracias
(4) 10:46 AM Erin: y tus ninos..como estan?
(5) 10:46 AM Emilia: hoy estara por los 80 o puedes decir: hoy va a estar por
(6) los 80
(7) 10:46 AM Erin: ok..bueno..gracias..estoy aprendido mucho de ti
(8) 10:47 AM Emilia: que bueno, a tus ordenes
(9) 10:47 AM Erin: esto es un gran oportunidad para mi
(10) 10:47 AM Erin: gracias
(11) 10:47 AM Emilia: yo se. Esto del chat me parece una idea genial
(12) 10:47 AM Erin: does that mean "at your service"
(13) 10:47 AM Emilia: si

(1) 10:45 AM Erin: 'it's going to be or it will be'
(2) 10:46 AM Emilia: 'it will be'
(3) 10:46 AM Erin: 'thanks'
(4) 10:46 AM Erin: 'and your children..how are they?'
(5) 10:46 AM Emilia: 'today it will be around 80 degrees or you can say: today it is going to be around'
(6) '80'
(7) 10:46 AM Erin: ok.. 'good..thanks.. I am learning a lot from you'
(8) 10:47 AM Emilia: 'good, at your service'
(9) 10:47 AM Erin: 'this is a great opportunity for me'
(10) 10:47 AM Erin: 'thanks'
(11) 10:47 AM Emilia: 'I know. This chat thing seems like a great idea'
(12) 10:47 AM Erin: does that mean "at your service"
(13) 10:47 AM Emilia: 'yes'

4.8.1.1.2 Conversation Management and Pragmatic Markers

In Session 1, Erin and Emilia established that they had a lot in common. They discovered that they were only 5 years apart in age (indeed, Erin was the only participant over 21) and that they both were very devoted mothers of 2 children. None of their sessions went without mention of their children. Moreover, Erin indicated to Emilia that she was interested in becoming a Spanish teacher and had a long-standing passion for the

Spanish language. She had originally gone through language training through the Department of Defense while in the Marines. While Emilia developed amicable relationships with the other participants, it was clear from the beginning that Erin and Emilia were particularly fond of one another. One of her comments in Session 4 made Erin's feelings toward Emilia clear: "oh GOOD (.) it's (Emilia) again (.) I guess she's doing all of the sessions" (10:27).

Erin nominated 3 of the 7 topics of discussion in Session 4; including children, Emilia's work as a private chef, and how Emilia ended up in Connecticut. Emilia produced one set of three *ja*'s. Although Erin did not indicate any laughter, she did use several other alignment markers, such as *guau* 'wow' (3 instances), *igual yo* 'me too' (2 instances) and *que bien* 'great' (1 instance). Interestingly, *guau* and *igual yo* were forms learned during previous sessions. It is interesting to note that pragmatic markers, especially the *ja*, were the most frequently repeated by the participants. Only in very few instances did the participants resort to the English (orthographic) equivalent once they had been exposed to the corresponding Spanish form.

4.8.1.1.3 Metacognition

Erin was the only participant who consistently made think-aloud comments in Spanish. She made roughly 21 intelligible comments in Session 4, of which 3 were in Spanish. These comments, of course, did not include speaking words aloud as she typed them or reading Emilia's entries aloud. Erin's Spanish think-aloud comments were evaluative and meta-linguistic or meta-conversational in nature. For example, she stated "*bueno, aquí estoy lista para otro sesión* (.) *me gusta chatear porque no estoy tomando clases de español este semestre y es muy importante practicar*" (10:26). Additionally,

Erin made 3 comments indicating that she did not understand what was said (e.g. "what is *testarudo*?" [10:41]), 3 comments indicating that she did not know how to say something (e.g. "how would you say sports in general?" [10:43]), 4 comments indicating uncertainty of output (e.g. "*quería* (.) is that right?" [10:30]), 3 comments confirming resolution of an LRE (e.g. "oh (.) ok (.) stubborn" [10:41]), and 5 meta-conversational comments (e.g. "oh my goodness" [10:50]).

Emilia's ranking of Erin's proficiency was 8 out of a possible 10 points.

4.8.1.2 Session 7

Session 7 marked the second instance in which technical difficulties cut the interaction very short. This time, the problem was clearly identified: limited accessibility to the learning management system that supports the online conferencing software. Erin was only 4 minutes late to the session because she had gotten a much earlier start attempting to log on in order to complete her pre-session survey. Emilia had considerably more trouble accessing the system and was 17 minutes late to the session. The interaction lasted 13 minutes and contained 476 words that spanned 51 entries, 28 by Emilia and the remaining 23 by Erin. Ordinarily, I would have eliminated the session and asked Erin to reschedule it, but the fact that this session provided the greatest contrast to session 4, coupled with the fact that it revealed a significant shift in BFI Subscale 4 (=agreeableness) prompted me to keep it.

4.8.1.2.1 Language-related episodes, conversation management & pragmatic markers, and metacognition

Erin was very aware of the fact that the learning management system was having technical difficulties as she herself made several unsuccessful attempts to log on. Her think-aloud comments acknowledged the technical issues and expressed doubt that Emilia would make the session. Exchange 42 below details Emilia's belated arrival.

Exchange 42:

(1) 10:47 AM Emilia: hola (Erin)!
(2) 10:47 AM Erin: hola (Emilia)!
(3) 10:47 AM Emilia: siento haber llegado tan tarde, es que me tomo una
(4) eternidad ingresar al chat
(5) 10:48 AM Erin: Yo tambien teni muchas problemas esta manana
(6) 10:48 AM Emilia: Si, tuviste muchos problemas
(7) 10:48 AM Emilia: oye, (Erin), solo puedo chatear por 10 minutos hoy.
(8) Que te parece si terminamos temprano?
(9) 10:49 AM Emilia: podemos recuperar el tiempo en la siguiente sesion
(10) 10:49 AM Erin: si, yo tambien tengo que ir en 10 minutos.
(11) 10:49 AM Emilia: 10 minutos sera suficiente?
(12) 10:49 AM Emilia: O preferirias tomar la sesion en otro momento?
(13) 10:50 AM Erin: en otro momento?
(14) 10:50 AM Emilia: si, podemos hacerla otro dia o mas tarde hoy
(15) 10:51 AM Erin: oh entiendo
(16) 10:51 AM Erin: no se
(17) 10:51 AM Emilia: bueno, aprovechamos estos 10 minutos y a ver
(18) que dice el profe despues, te parece?
(19) 10:51 AM Erin: esta bien

(1) 10:47 AM Emilia: 'hello (Erin)!'
(2) 10:47 AM Erin: 'hello (Emilia)!'
(3) 10:47 AM Emilia: 'I'm sorry for arriving so late, it's that it took me an'
(4) 'eternity to get into the chat'
(5) 10:48 AM Erin: 'I also had many problems this morning'
(6) 10:48 AM Emilia: 'Yes, you had many problems' ((recast))
(7) 10:48 AM Emilia: 'listen, (Erin), I can only chat for 10 minutes today.'
(8) 'What do you think if we end early?'
(9) 10:49 AM Emilia: 'we can recoup the time in the next session'
(10) 10:49 AM Erin: 'yes, I also need to go in 10 minutes.'

(11) 10:49 AM Emilia: '10 minutes will be enough?'
(12) 10:49 AM Emilia: 'Or would you prefer to do the session at another time?'
(13) 10:50 AM Erin: 'at another time?'
(14) 10:50 AM Emilia: 'yes, we can do it another day or later today'
(15) 10:51 AM Erin: oh 'I understand'
(16) 10:51 AM Erin: 'I don't know'
(17) 10:51 AM Emilia: 'fine, we'll take advantage of the 10 minutes and see'
(18) 'what the prof. says afterwards, OK?'
(19) 10:51 AM Erin: 'fine'

Nearly one third of the conversation was given to negotiating whether or not the conversation should even be taking place. The remaining 9 minutes covered the 2 topics of children and summer plans, both nominated by Emilia. There was no indication of laughter and Emilia closed the session on a note of regret with "*(Erin), lamentablemente nuestra session esta por terminar*" (10:59).

The only LREs in Session 7 was a recast (see Line 6 in Exchange 42 above) and a meaning negotiation (see Line 13 in Exchange 42 above). The first LRE appeared to be a bit bold, given the fact that it followed an apology. In all, the session seemed abrupt and rushed. Emilia's final ranking of Erin's proficiency was 7 out of 10 points.

4.8.2 Personality

Erin's average pre- to post-session BFI shift of 0.113133 (see Table 22 below) out of the 5-point Likert scale used to measure BFI items was among the highest; in fact, only John's was higher. Moreover, Erin's standard deviation of 0.216491was the lowest of all the participants. It could be said, therefore, that Erin experienced the most predictable, upward pre- to post-session personality shifts.

Three such shifts were significant. They were seen in Subscale 4 (=agreeableness) of Sessions 2 and 7 and Subscale 1 (=openness) of Session 3. Even

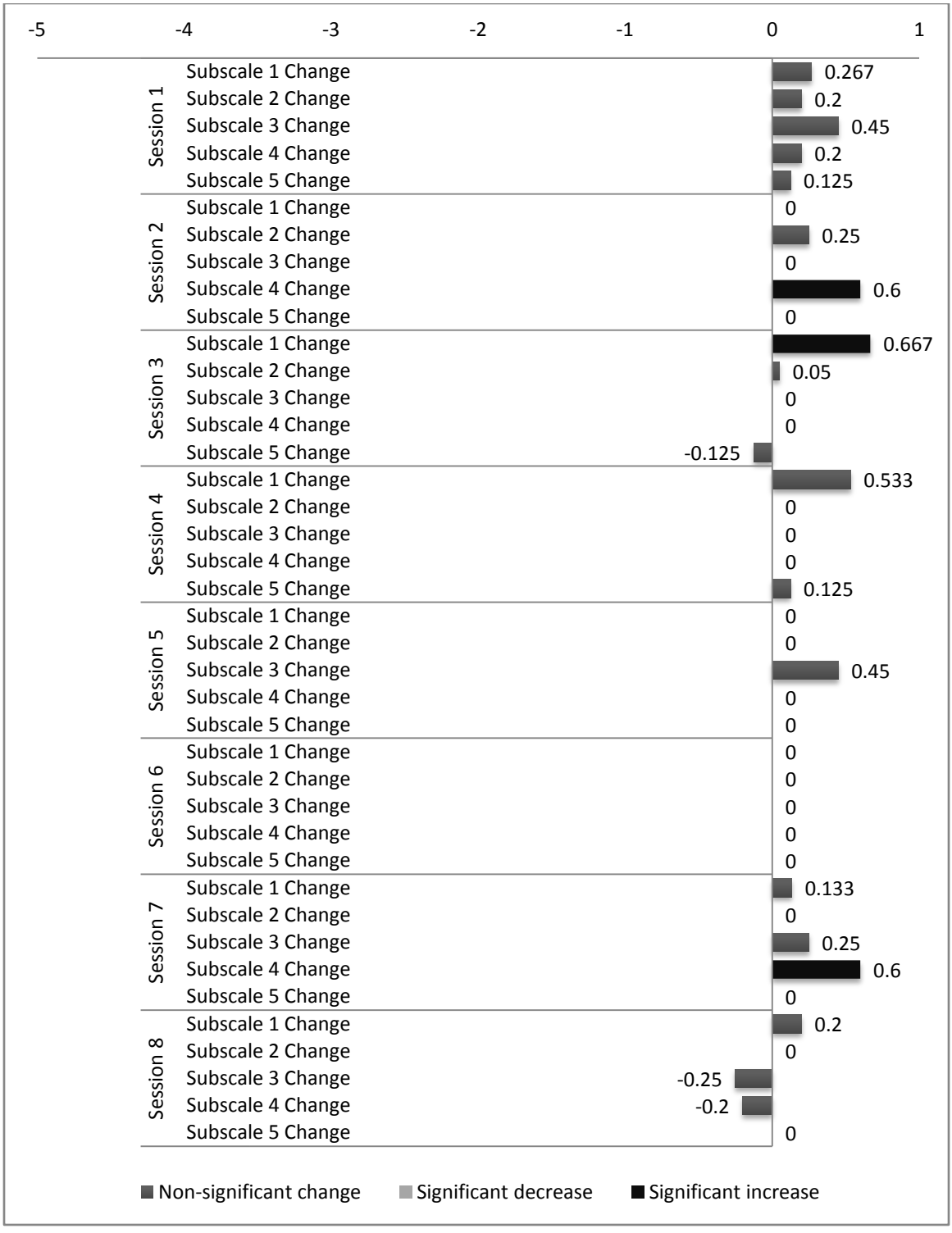

Table 22: Changes in Erin's BFI items from pre- to post-session

though the shift in Session 3 was more significant (p = 0.0145) than the shifts in Sessions 2 and 7 (p=0.0302), the greatest, and most significant *difference* was between Session 2/Session 7 and Session 8 (p = 0.0063). Session 7 was analyzed in the previous section, and Session 8 is analyzed in the following section.

4.8.2.1 Session 8

Session 8 lasted 14 minutes and contained 761 words that spanned 71 entries, 29 of which were said by Erin and the remaining 42 by Emilia.

4.8.2.1.1 Language-related episodes

There were three LREs in Session 8: one structural negotiation concerning preterit/imperfect usage, and two meaning negotiations. All were initiated by Erin. Interestingly, Emilia ignored the two meaning negotiations, as illustrated in Exchange 43.

Exchange 43:

(1) 9:28 AM Emilia: bueno, mi tia viene de Suiza con su nina de 9 anos
(2) por mes y medio.Luego viajaremos juntas a Florida a visitar a mi mama
(3) por 2 semanas. Ella vive cerca a Orlando y pensamos manejar hasta
(4) Miami. Que aun no conozco y estoy entusiasmada por visitar
(5) 9:29 AM Emilia: y tu?
(6) 9:29 AM Erin: cuando? mi hermano vive en
(7) kissimmee
(8) 9:29 AM Emilia: en serio? eso es cerca. Mis padres viven en
(9) Clermont
(10) 9:29 AM Erin: tal vez podriamos juntar..meet?
(11) 9:29 AM Erin: reunir?
(12) 9:29 AM Emilia: creo que viajaremos la primera semana de
(13) agosto.
(14) 9:29 AM Emilia: Seguro me encantaria
(15) 9:30 AM Emilia: tienes mi e-mail?

(1) 9:28 AM Emilia: 'well, my aunt is coming from Switzerland with her 9-year-old daughter'

(2) ‘for a month and a half. Then we will travel together to Florida to visit my mother’
(3) ‘for 2 weeks. She lives close to Orlando and we are thinking of driving to’
(4) ‘Miami. Which I still haven’t been to and am excited to visit’
(5) 9:29 AM Emilia: ‘and you?’
(6) 9:29 AM Erin: ‘when? my brother lives in’
(7) kissimmee
(8) 9:29 AM Emilia: ‘really? that’s close. My parents live in’
(9) Clermont
(10) 9:29 AM Erin: ‘maybe we could put together’..meet? ((translation request))
(11) 9:29 AM Erin: ‘meet?’
(12) 9:29 AM Emilia: ‘I think we will travel the first week of’
(13) ‘August.’
(14) 9:29 AM Emilia: ‘Of course I’d love that.’
(15) 9:30 AM Emilia: ‘do you have my e-mail?’

In Lines 10 and 11, Erin asked Emilia if *juntar* or *reunir* was the better translation of *to meet*. Clearly, Emilia read Erin’s entry, because in Line 14 she responded to Erin’s suggestion, but ignored her attempt to initiate a meaning negotiation. This exchange also illustrates a unique event in which Emilia agreed to meet Erin. In fact, Erin was the only participant to maintain contact with Emilia beyond the last session. It is possible that Emilia was either too wrapped up in the discussion to interrupt the flow of conversation, or that she was more reluctant to assume the teacher role with someone she considered more as her friend.

4.8.2.1.2 Conversation Management and Pragmatic Markers

In contrast to Session 7, Erin was late to arrive. She indicated that, once again, she had difficulties logging into the learning management system. She began the session by issuing an apology (see Exchange 44 below).

Exchange 44:

(1) 9:17 AM Emilia: (Erin)?
(2) 9:19 AM Erin: hola
(3) 9:19 AM Emilia: hola (Erin)! Como estas?
(4) 9:19 AM Erin: no podia conectar, lo siento
(5) 9:19 AM Erin: estoy bien, y tu?
(6) 9:20 AM Emilia: muy bien, gracias!!!

(1) 9:17 AM Emilia: (Erin)?
(2) 9:19 AM Erin: 'hi'
(3) 9:19 AM Emilia: 'hi (Erin)! How are you?'
(4) 9:19 AM Erin: 'I couldn't connect, I'm sorry'
(5) 9:19 AM Erin: 'I'm fine, and you?'
(6) 9:20 AM Emilia: 'very well, thanks!!!'

Erin issued yet another apology later on in the session following a pause that lasted less than one minute (see Exchange 45 below).

Exchange 45:

(1) 9:26 AM Erin: tuve que contestar el telefono de mi esposo...lo siento
(2) 9:26 AM Emilia: NO, NO TRANQUILA

(1) 9:26 AM Erin: 'I had to answer my husband's telephone…I'm sorry'
(2) 9:26 AM Emilia: 'NO, NO DON'T WORRY'

In all, Emilia nominated 2 topics and Erin nominated one. Additionally, Erin made the suggestion that they meet in Florida over the summer. Although there was no laughter, the above examples illustrate more overt moves towards solidarity and friendship.

4.8.2.1.3 Metacognition

As in previous sessions, Erin's think aloud was mostly given to mumbling, reading aloud, and formulating sentences as she typed. Also, as in Session 4, Erin

showed no aversion to LREs. She made two comments (out of 9 total intelligible comments) indicating that she was uncertain how to say something, and both times, she attempted to initiate an LRE with Emilia. She did not indicate any dismay over the fact that Emilia ignored her attempts.

Erin also made two comments to check microphone levels (e.g. "I don't know if you can hear me (.) can you hear me now?" [9:27]), four meta-conversational comments (e.g. "oh my goodness"[9:28] and "*es todo* (.) *vamos a comunicar de otra manera* (.) *bueno* (.) *adios*" [9:33]), and two self-evaluation comments (e.g. "*necesito practicar más mi español porque no tenemos clases este semestre entonces voy a leer en voz alto para practicar y tal vez puedo* (.) *podría charlar un poco*" [9:27]). She indicated no remorse at being late to the session.

Emilia ranked Erin's proficiency at 9 out of a possible 10 points, the highest ranking she gave any participant. It would seem that Emilia confounded her estimation of Erin's proficiency with her affinity for Erin; again, resonating with Lave and Wenger's (1991) notions of legitimate peripheral participation in which they reframe learning not as acquiring certain (linguistic) structures, but rather as successfully engaging in social relationships that involve such structures. At least from a NS's standpoint, it seems as though target-like performance is no more critical than successful engagement. Note that this session did not present the smallest number of LREs, nor the smallest number of structural errors, even despite its short duration. Nonetheless, it received Emilia's highest ranking.

4.8.3 Reading Span

Erin's pre- to post-session changes in reading span reveal no significant shifts. Therefore, any comparisons between sessions would be entirely speculative.

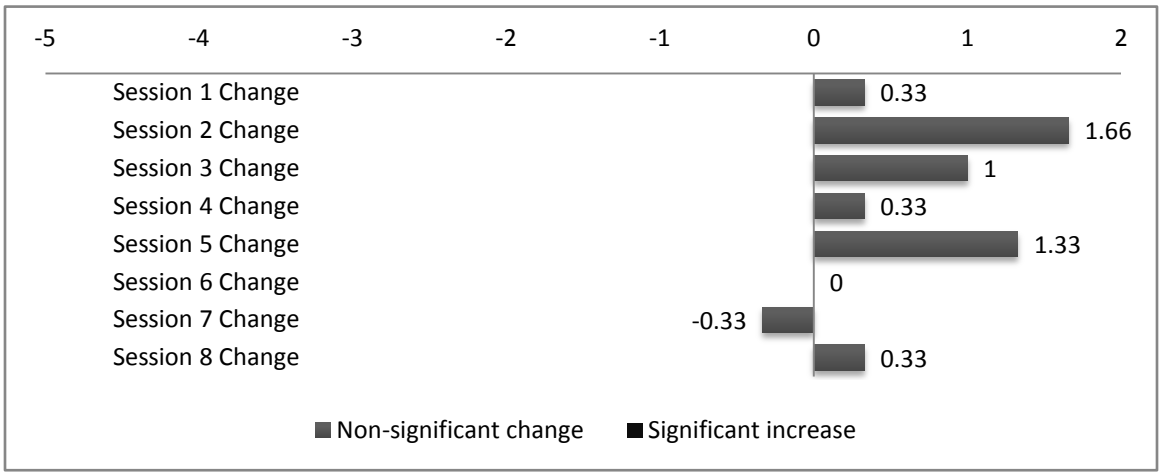

Table 23: Changes in Erin's Reading Span from pre- to post-session

4.8.4 Summary

Erin was the only participant whose ATMB profile was not adversely affected in conjunction with LREs. Session 4, with a significant increase in Subscale 3 (=motivational intensity), actually elicited three times more LREs than Session 7, which had a significantly lower shift in the same subscale. The only mitigating factor was that one of the two LREs in Session 4 was a recast, whereas all of the LREs in Session 4 were initiated by Erin. Again, the apparent contradiction could be explained in terms of face. Erin's desire to be a Spanish teacher coupled with her eagerness to initiate LREs and her gratitude for Emilia's help could indicate that Erin simply did not view LREs as face-threatening as the other participants did. Perhaps unsolicited LREs were slightly more

threatening, which might explain the (non-significant) negative pre- to post-session shift in Session 7. Given the technical complications and the unusual nature of the session, however, it is difficult to rule out other possibilities.

With respect to personality variables, it appears once again that disrupted sessions in which the participants are not at fault coincide with positive shifts in BFI Subscale 4 (=agreeableness). Perhaps this shift is due to the participants forgiving, consciously overlooking, or otherwise forgoing their right to be frustrated by the interlocutor's lateness and/or technical issues. None of the think aloud comments during these episodes was indicative of any anger or excessive frustration, even if the participants felt that they had a right to be upset.

Their pre- to post-session increase in Subscale 4 (=agreeableness) was also evident in the pragmatics of the conversation, in that the interlocutor opened with an apology or excuse, which the participants accepted without reservations. Of course, accepting an apology is far easier to accomplish linguistically than rejecting one, which again illustrates the importance of the think aloud to determine whether or not the acceptance was sincere. To what extent the act of accepting an apology, as opposed to suppressing frustration at the metacognitive level, holds sway over levels of agreeableness is difficult to say. It would be interesting to observe an acceptance coupled with hard feelings expressed in the think aloud, or vice versa, in order to ascertain how the two interact with agreeableness levels.

It should be noted that Session 2 also saw a significant pre- to post-session increase in BFI Subscale 4 (=agreeableness). While Session 2 was not stifled by technical difficulties as was Session 4, Emilia was apologetic for not being able to answer Erin's questions concerning the proper use of *ser* and *estar* 'to be'. After repeated, failed attempts at clarifying the distinction, Emilia concluded, "*al respecto con 'son' y 'estan'*

lo ignoro, pero consulta con el profesor. Estoy segura que el te dara mejor informacion" (10:54) 'with respect to (the difference between) *son* and *están*, I don't know it, but consult with the professor. I'm sure he will give you better information'. Erin's response was simply, "*bueno*" 'good', which she did not elaborate upon in the think aloud data. Emilia issued two other apologies during the sessions for typographical errors, but this final LRE appeared to require the most acceptance (or agreeableness) on Erin's part.

Session 4 illustrated the emergence of pragmatic markers, such as *guau* 'wow' and *igual yo* 'me too'. It was noted that Spanish pragmatic markers, especially the *ja*, invariably emerge in all participants through the course of the 8 sessions. Some cases were limited to the *ja*, while other cases, such as Erin's and Lori's showed evidence of more extensive learning of pragmatic markers.

4.9 JOHN

At the time of the study, John was a 20 year-old male. He was currently enrolled in a second-semester Spanish course at St. Edward's university and had previously studied Spanish for 2 semesters. He was a NS of English and spoke no other languages at home.

4.9.1 Attitudes and Motivation

John experienced the most negative average pre- to post-session AMTB change of all the participants: -0.3 out of the 7-point Likert scale used to measure AMTB items (see Table 24 below). Casey was the only other participant who showed a negative average change (-0.0333), but it was only one-tenth the magnitude of John's change.

Additionally, John showed the second highest standard deviation of 0.930638. Only Lori's standard deviation of 1.0708 was higher. Taken together, it appears as though John's reactions to the sessions were very unpredictable, but generally negative, at least in terms of his motivation or desires/attitudes towards learning Spanish.

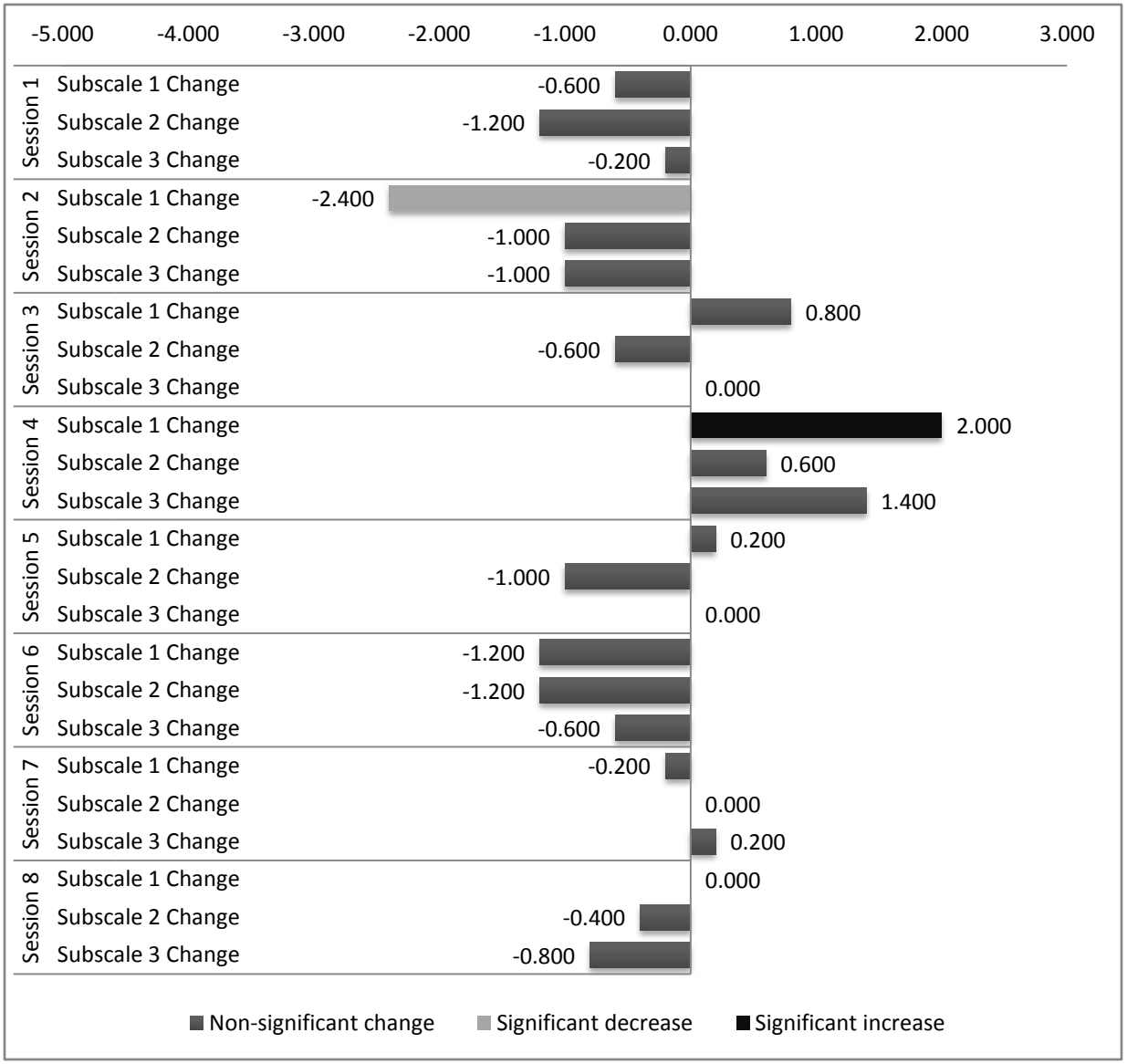

Table 24: Changes in John's AMTB items from pre- to post-session

John's case is important in that it provides a very clear opportunity for comparing two sessions. In Session 2, John experienced a significant pre- to post-session downshift in Subscale 1 (=attitudes towards learning Spanish) (p=0.0339). In Session 4, he experienced a significant pre- to post-session *increase* in the same subscale (p = 0.0213). No other shifts attained a level of significance. For this reason, Sessions 2 and 4 are compared in the following sections.

4.9.1.1 Session 2

Session 2 lasted 31 minutes and consisted of 582 words that spanned 141 entries, of which 63 were produced by John, and the remaining 78 were by Emilia.

4.9.1.1.1 Language-related episodes

There were 14 LREs in Session 2, nearly one every 2 minutes, which was a relatively very high number. There were 9 recasts, 2 comprehension checks, 3 meaning negotiations (2 of which were initiated by John) and one translation request by John. The longest LRE lasted 3 TCUs, although, as in Jessica's case, they were sometimes disjoined by the conversation.

4.9.1.1.2 Conversation Management and Pragmatic Markers

John produced 5 pairs of *ja*'s, and Emilia produced one pair and 3 sets of 3 *ja*'s. There were no pauses that lasted longer than one minute. Indeed, with 141 entries in the span of a 31-minute conversation, there was an average of over 4 entries per minute. Emilia's conversation with John flowed more rapidly than with any other participant. She even complimented John on his quick pace (see Exchange 46 below).

Exchange 46:

(1) 10:58 AM Emilia: (John) estoy sorprendida
(2) 10:58 AM John: yo soy contento que te gusta
(3) cocinar!
(4) 10:58 AM Emilia: ja,ja,ja gracias
(5) 10:59 AM Emilia: yo estoy contento
(6) 10:59 AM John: yo es sorprendida simpre
(7) 10:59 AM John: jaja
(8) 10:59 AM Emilia: no, te digo que estoy sorprendida de que es
(9) 10:59 AM Emilia: facil conversar contigo
(10) 11:00 AM John: gracias
(11) 11:00 AM Emilia: de nada
(12) 11:01 AM Emilia: Sigue asi
(13) 11:01 AM Emilia: vas aprender espanol muy rápido

(1) 10:58 AM Emilia: '(John) I'm surprised'
(2) 10:58 AM John: 'I am happy that you like'
(3) 'to cook!'
(4) 10:58 AM Emilia: ja,ja,ja 'thanks'
(5) 10:59 AM Emilia: 'I am happy' ((recast))
(6) 10:59 AM John: 'I am always surprised'
(7) 10:59 AM John: jaja
(8) 10:59 AM Emilia: 'no, I mean that I am surprised that it is'
(9) 10:59 AM Emilia: 'easy to converse with you'
(10) 11:00 AM John: 'thanks'
(11) 11:00 AM Emilia: 'you're welcome'
(12) 11:01 AM Emilia: 'Don't change'
(13) 11:01 AM Emilia: 'you're going to learn Spanish very quickly'

It appears as though this compliment was issued solely on the basis of John's loquacity and not his proficiency nor the topics he nominated. John did not recognize the onset of Emilia's compliment in Line 1, which was interrupted by a recast in Line 5. Still, Emilia seemed to enjoy John's willingness to take risks and help carry the conversation. Even though John's entries were often rife with non-targetlike forms, he moved quickly and made himself understood. Emilia issued a second compliment to this effect, shown in Exchange 47 below.

Exchange 47:

(1) 11:04 AM Emilia: vas rapido
(2) 11:04 AM Emilia: eso esta muy bien
(3) 11:04 AM John: gracias
(4) 11:04 AM Emilia: te felicito!!!

(1) 11:04 AM Emilia: 'you are fast'
(2) 11:04 AM Emilia: 'that's really good'
(3) 11:04 AM John: 'thank you'
(4) 11:04 AM Emilia: 'congratulations!!!'

John was in a second-semester Spanish class, so his linguistic resources were understandably limited. Still, he used them to his advantage: he was usually the first to nominate a topic, even though the same question appeared in nearly every session: "*¿Qué hiciste el fin de semana pasada?*" 'what did you do last weekend?'

One episode that set this session apart from others was that it was the only session analyzed in which Emilia teased a participant (see Exchange 48 below).

Exchange 48:

(1) 10:40 AM John: yo diversirse
(2) 10:41 AM Emilia: te divertiste?
(3) 10:41 AM Emilia: donde, como?
(4) 10:41 AM John: fui a la fiesta con mi amigos!
(5) 10:41 AM Emilia: aja!
(6) 10:41 AM Emilia: a mirar chicas!
(7) 10:41 AM John: jaja
(8) 10:41 AM Emilia: ja,ja,ja
(9) 10:42 AM John: yo tengo un novia en california!
(10) 10:42 AM Emilia: Si, si, si una en california y en Austin
(11) 10:42 AM John: yo no miro chicas en austin! jaja
(12) 10:42 AM Emilia: y en Austin??
(13) 10:43 AM Emilia: ja,ja,ja, me parece muy bien

(1) 10:40 AM John: 'I have fun'
(2) 10:41 AM Emilia: 'you had fun?' ((recast))
(3) 10:41 AM Emilia: 'where, how?'
(4) 10:41 AM John: 'I went to the party with my friends!'

(5) 10:41 AM Emilia: ‘aha!’
(6) 10:41 AM Emilia: ‘to look at girls!’
(7) 10:41 AM John: jaja
(8) 10:41 AM Emilia: ja,ja,ja
(9) 10:42 AM John: ‘I have a girlfriend in California!’
(10) 10:42 AM Emilia: ‘Yes, yes, yes one in California and in Austin’
(11) 10:42 AM John: ‘I don’t see girls in Austin!’ jaja
(12) 10:42 AM Emilia: ‘and in Austin??’
(13) 10:43 AM Emilia: ja,ja,ja, ‘that seems good’

Emilia’s teasing was a risky move to make in the second session, before the two had developed a closer relationship, as it may have been perceived as a threat to positive face. There was no evidence, however, that John understood it as such.

It should also be noted that Emilia issued an apology towards the beginning of the session, *perdona por haberte hecho esperar* ‘sorry to make you wait’ (10:38). John had arrived just as Emilia was wrapping up a session with Casey, and she asked John to wait 5 minutes while she finished. He did not object, and Emilia was ready to begin his session only 2 minutes later than scheduled. This sort of apology does not rise to the same level of face-threatening act, nor did it require acceptance (a negative face-threatening act on the part of the participant), as did Emilia’s apologies for being 18 minutes late with Jessica, or 17 minutes late with Erin.

Finally, near the end of the session, John asked Emilia if he could contact her via Facebook or email. Emilia was not as receptive to John’s request as she was to Erin’s request to meet in Florida. She did not give John her email address, as she did to Erin, but told him that he could look her up on Facebook. This is one of the few instances in which a participant initiated a face-threatening act that resulted in a curt, if not negative, reaction (see Exchange 49 below).

Exchange 49:

(1) 11:06 AM John: do you have facebook or email?
(2) 11:07 AM Emilia: si puedes buscarme en facebook
(3) 11:07 AM Emilia: Fue un placer hablar contigo
(4) 11:07 AM John: si
(5) 11:08 AM Emilia: Hasta la próxima!
(6) 11:08 AM John: y tu
(7) 11:08 AM John: adios
(8) 11:08 AM Emilia: Adios

(1) 11:06 AM John: do you have facebook or email?
(2) 11:07 AM Emilia: 'yes you can look me up on facebook'
(3) 11:07 AM Emilia: 'It was a pleasure to speak to you'
(4) 11:07 AM John: 'yes'
(5) 11:08 AM Emilia: 'Until next time!'
(6) 11:08 AM John: 'and you'
(7) 11:08 AM John: 'good bye'
(8) 11:08 AM Emilia: 'Good bye'

4.9.1.1.3 Metacognition

John made no intelligible think-aloud comments. Moreover, there were no pauses that lasted over one minute, as the conversation was relatively fast-paced. The only markers of monitoring were two self-corrections, and the markers of meta-linguistic self-evaluation were apparent in some of the LREs, as in Exchange 50 below.

Exchange 50:
(1) 11:02 AM Emilia: porque te fuiste a vivir a Connecticut?
(2) 11:03 AM Emilia: Yo vine a este pais hace 10 anos
(3) 11:03 AM John: ahh, si. Porque te fuiste a vivir a connecticut. no como
(4) fuiste a la connecticut? jaja
(5) 11:03 AM Emilia: jaja
(6) 11:03 AM Emilia: esta bien!
(7) 11:03 AM John: yo aprendo, yo aprendo....

(1) 11:02 AM Emilia: 'because you went to live in Connecticut?'
(2) 11:03 AM Emilia: 'I came to this country 10 years ago'
(3) 11:03 AM John: 'ahh, yes. Because you went to live in Connecticut, not how'
(4) 'did you go (to) Connecticut?' jaja

(5) 11:03 AM Emilia: jaja
(6) 11:03 AM Emilia: 'it's fine!'
(7) 11:03 AM John: 'I'm learning, I'm learning….'

Emilia's ranking of John's proficiency was 7 out of a posible 10 points, which is surprising, given the sheer number of LREs, and the fact that John had not yet completed lower-division Spanish. For Session 2, Emilia ranked John's classmates, such as Sally and Jessica, at 4 out of 10. She even ranked Haley and Casey lower, even though they were in their fifth semester of Spanish and produced fewer non-targetlike forms. The only participant that received a similar ranking by Session 2 was Erin, the other participant with whom Emilia developed a closer relationship.

4.9.1.2 Session 4

Recall that while Session 2 showed a significant pre- to post-session downshift in Subscale 1 (= attitudes towards learning Spanish) ($p = 0.0339$), Session 4 showed a significant upswing in the same subscale ($p = 0.0213$). Session 4 lasted 29 minutes and consisted of 597 words that spanned 107 entries, of which 46 were by John, and the remaining 61 were by Emilia, the interlocutor.

4.9.1.2.1 Language-related episodes

There were 9 LREs in Session 4, far fewer than in Session 2. The LREs consisted of 4 recasts, 4 negotiations of meaning (3 of which were initiated by John), and 1 translation request by John. Again, the longest LRE involved 3 TCUs.

4.9.1.2.2 Conversation Management and Pragmatic Markers

Much of the conversation centered on the recent Easter vacation, which lasted four days for John. John's week following the vacation was quite hectic, and he apparently realized how unprepared he was, as shown in Exchange 51 below.

Exchange 51:

(1) 10:38 AM John: tengo muchos examenes
(2) 10:38 AM Emilia: de verdad?
(3) 10:38 AM John: de verdad???
(4) 10:39 AM Emilia: de verdad = really?
(5) 10:39 AM John: oh si y no estudio mucho en la casa en vacaciones
(6) 10:39 AM Emilia: no estudiaste para tus examenes durante las
(7) vacaciones?
(8) 10:40 AM John: y tengo un papel
(9) 10:40 AM John: y un examen en espanol
(10) 10:40 AM Emilia: Que estudias en tu clase de espanol?
(11) 10:40 AM John: No se!
(12) 10:40 AM Emilia: ja,ja,ja,ja!
(13) 10:41 AM John: el body?
(14) 10:41 AM Emilia: si, el cuerpo
(15) 10:42 AM John: imperfect
(16) 10:42 AM Emilia: el imperfecto es algo dificil aprender
(17) 10:42 AM John: si
(18) 10:42 AM Emilia: bueno, seguro que todo te saldra bien.
(19) 10:43 AM Emilia: no te preocupes.

(1) 10:38 AM John: 'I have a lot of tests'
(2) 10:38 AM Emilia: 'really?'
(3) 10:38 AM John: 'really???' ((meaning negotiation))
(4) 10:39 AM Emilia: *de verdad* = really?
(5) 10:39 AM John: 'oh yes and I don't study a lot in the house on vacation'
(6) 10:39 AM Emilia: 'you didn't study for your tests during the'
(7) 'holidays?' ((recast))
(8) 10:40 AM John: 'and I have a paper'
(9) 10:40 AM John: 'and a test in Spanish'
(10) 10:40 AM Emilia: 'What are you studying in your Spanish class?'
(11) 10:40 AM John: 'I don't know!'
(12) 10:40 AM Emilia: ja,ja,ja,ja!
(13) 10:41 AM John: 'the' body? ((translation request))
(14) 10:41 AM Emilia: 'yes, the body'
(15) 10:42 AM John: imperfect

(16) 10:42 AM Emilia: ‘the imperfect is pretty difficult to learn’
(17) 10:42 AM John: ‘yes’
(18) 10:42 AM Emilia: ‘well, I’m sure everything will work out well for you.’
(19) 10:43 AM Emilia: ‘don’t worry.’

John admitted that he did not know the Spanish word for *body* nor did he fully grasp the imperfect, both of which were major components of the upcoming exam. Even though Emilia found humor in John’s admission that he had lost track of what he was studying in his Spanish class, John appeared to be more concerned about the amount of work that he needed to accomplish in a short, 4-day week.

In all, John nominated half of the 4 topics of conversation: Easter weekend and Emilia’s English classes. There were no pauses that lasted over one minute and Emilia produced the only laughter (see Line 12 above). There were no other markers of solidarity outside of the opening and closing sequences. This session represents a marked contrast to Session 2 in that there were no compliments, fewer markers of solidarity and no attempts to establish a relationship outside of the study. While such factors do not appear to impact attitudes and motivation negatively, they may well have impacted personality test items, as discussed in the following section.

4.9.1.2.3 Metacognition

Just as in Session 2, John was largely silent during Session 4 and none of his comments were intelligible. Moreover, there were no metacognitive markers, such as extended pauses. Unfortunately, the lack of think-aloud data makes a multi-dimensional analysis of the interaction nearly impossible. Emilia ranked John’s proficiency at 7 out of a possible 10 points.

4.9.2 Personality

As with John's attitudes and motivation, his BFI profile showed a relatively high average pre- to post-session shift of 0.115625 of the 5-point Likert scale used to measure personality items (see Table 25 below). Again, only Casey exhibited a higher average change (-0.1229). Recall that BFI traits are value-neutral, unlike motivation for example, which means that a 'negative' shift is merely a shift towards one end of a spectrum and does not represent a 'loss' as would be the case in measures of motivation. For this reason, the magnitudes of shifts are compared irrespective of whether they are positive or negative. John's BFI standard deviation of 0.637914 was also relatively high. Only Jessica's standard deviation of 0.704 was higher. Taken together, these rankings would indicate that John was relatively apt to experience shifts in his BFI profile, although the nature of such changes was relatively unpredictable.

John's pre- to post-sessions changes reveal a curious contrast in Sessions 3 and 4. In both sessions, Subscale 2 (=conscientiousness) exhibited identical, significant, negative shifts ($p = 0.0459$), while only in Session 4 did Subscale 5 (=neuroticism) show a highly significant, positive shift ($p = 0.0012$). This pattern raises questions as to what event(s) might have prompted identical shifts in conscientiousness, but significantly variable shifts in neuroticism. Session 4 was analyzed in Section 4.9.1.2 above, and Session 3 is analyzed in the following section.

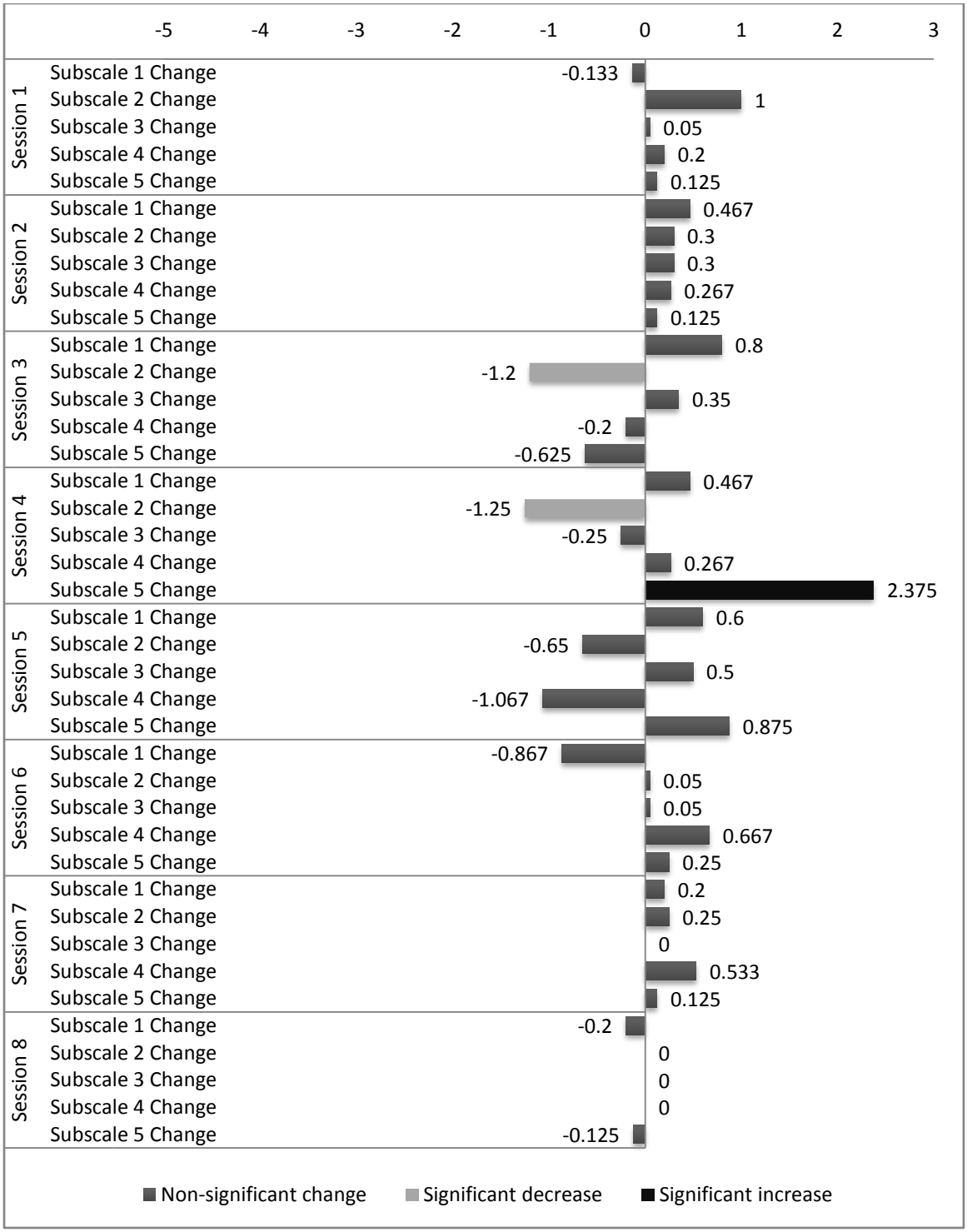

Table 25: Changes in John's BFI items from pre- to post-session

4.9.2.1 Session 3

Session 3 lasted 30 minutes and consisted of 615 words that spanned 102 entries, of which 45 were produced by John, and the remaining 57 were by Emilia.

4.9.2.1.1 Language-related episodes

There were 11 LREs in Session 3: 5 recasts, 4 negotiations of meaning, and 2 translation requests. All of the LREs were resolved within 3 TCUs.

4.9.2.1.2 Conversation Management and Pragmatic Markers

As usual, John nominated the first topic by asking Emilia what she had done the previous weekend. Thereafter, he nominated 1 of the remaining 5 topics of conversation. The topic nominated by John concerned a book he was excited to begin reading, *The Time of the Hero*, by Mario Vargas Llosa, an acclaimed Peruvian novelist and Nobel Prize laureate.

Exchange 52:

(1) 10:40 AM John: yo leo un libro interesante The Time of the Hero by
(2) Vargas Llosa
(3) 10:40 AM Emilia: UAU! me encanta Vargas Llosa, es un escritor peruano
(4) muy famoso
(5) 10:40 AM John: si!
(6) 10:41 AM Emilia: no reconozco ese titulo
(7) 10:41 AM John: es en una escuela military
(8) 10:41 AM John: que es military?
(9) 10:41 AM Emilia: puedes decir: una escuela militar
(10) 10:42 AM John: si una escuela militar y Vargas Llosa fui a la escuela
(11) 10:42 AM Emilia: sera La ciudad y los perros
(12) 10:42 AM John: sera?
(13) 10:43 AM Emilia: si, en espanol, ese libro se llama “La ciudad y los
(14) perros”

(15) 10:43 AM John: ahh ok
(16) 10:43 AM John: mi novia's padre fue a la escuela
(17) 10:44 AM Emilia: en serio?No me digas que tu enamorada es peruana!
(18) 10:44 AM John: si, el padre es peruana
(19) 10:44 AM Emilia: por eso estudias español, cierto?
(20) 10:44 AM John: jaja si!!!!
(21) 10:44 AM Emilia: ja,ja,ja!

(1) 10:40 AM John: 'I'm reading an interesting book' The Time of the Hero by
(2) Vargas Llosa
(3) 10:40 AM Emilia: 'WOW! I love Vargas Llosa, he is a Peruvian author'
(4) 'very famous'
(5) 10:40 AM John: 'yes!'
(6) 10:41 AM Emilia: 'I don't recognize that title'
(7) 10:41 AM John: 'it's a school' military
(8) 10:41 AM John: 'what is' military? ((translation request))
(9) 10:41 AM Emilia: 'you can say: a military school'
(10) 10:42 AM John: 'yes a military school and Vargas Llosa went to the school'
(11) 10:42 AM Emilia: 'that would be *La ciudad y los perros'*
(12) 10:42 AM John: 'would be?' ((meaning negotiation))
(13) 10:43 AM Emilia: 'yes, in Spanish, that book is called' "*La ciudad y los*
(14) *perros*"
(15) 10:43 AM John: ahh ok
(16) 10:43 AM John: 'my girlfriend's father went to the school'
(17) 10:44 AM Emilia: 'really? Don't tell me that your girlfriend is Peruvian!'
(18) 10:44 AM John: 'yes, the father is Peruvian'
(19) 10:44 AM Emilia: 'that's why you're studying Spanish, right?'
(20) 10:44 AM John: jaja 'yes!!!!'
(21) 10:44 AM Emilia: ja,ja,ja!

The decrease in recasts in this session when compared with Session 2 could not be attributed to a lack of opportunity. John codeswitched in Line 1, misconjugated a verb in Line 10, used the English genitive in Line 16, and assigned the wrong gender to the adjective in Line 18. Emilia had recast similar non-targetlike forms in other sessions, but it appears here as though she was too caught up in the conversation to interrupt the flow.

Indeed, the only two LREs that occurred in the above exchange were initiated by John, and promptly resolved by Emilia.

4.9.2.1.3 Metacognition

Again, John remained largely silent during this session, and there were no intelligible comments. As in Session 2, there were also no pauses that lasted over a minute. It could be that the pace of the interaction left John little time to reflect upon it, or at least too little time to articulate his reflections. Another possible explanation for the variable numbers of comments among the participants could simply be that some felt more comfortable voicing their thoughts than other did. In any case, Emilia ranked John's proficiency at 8 out of a possible 10 points, again an unexpectedly high score.

4.9.3 Reading Span

John's pre- to post-session changes in reading span reveal no significant shifts. Therefore, any comparisons between sessions would be entirely speculative.

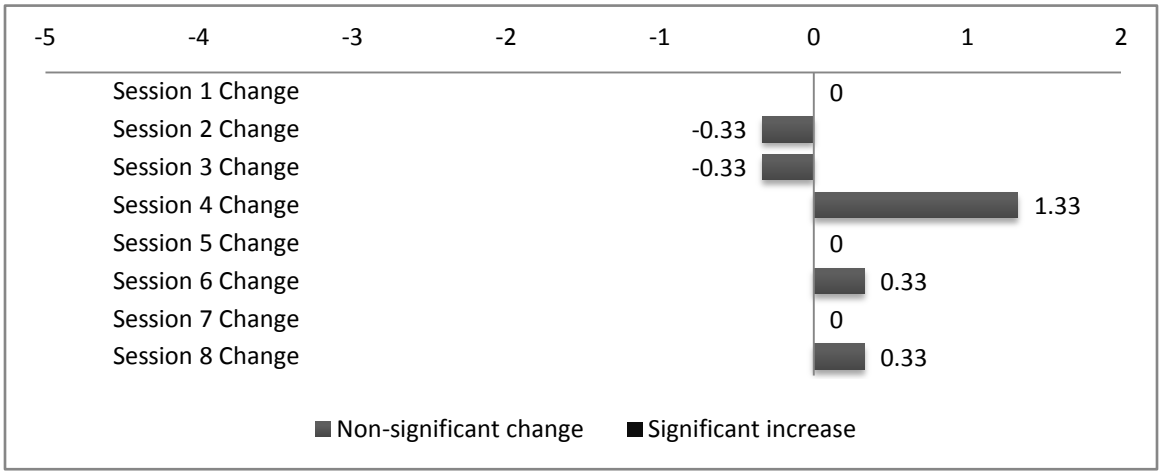

Table 26: Changes in John's Reading Span from pre- to post-session

4.9.4 Summary

All of the participants in this study, except for perhaps Erin and Lori, demonstrated a negative correlation between pre- to post-session shifts in AMTB subscales and LRE frequency, especially the frequency of LREs that are protracted and/or NS initiated. John's case is particularly interesting because it is possible to analyze a session contrastively in which his attitudes towards learning Spanish significantly improved against a session in which they significantly worsened from pre- to post-session. By contrast, cases such as Lori's, for example, only allowed the comparison between a session in which her attitudes towards learning Spanish improved with a session in which they showed significantly less improvement (but did not necessarily worsen). Clearly John's case provides a superior environment in which to ascertain which forces might be present in one scenario but not in another, and it indeed confirmed a pattern that has emerged through the course of the data analysis.

Yet another interesting pattern emerged: Emilia appeared to give the highest proficiency marks to those with whom she developed the closest relationships. Recall that Erin also received high marks and maintained contact with Emilia after the study was over. John was a second-semester Spanish student, and Erin was a seventh-semester Spanish student. Both had been students in my class and it was clear that Erin was far more proficient in terms of target-like production, range of topics and communicative competence, but still both received similar proficiency rankings by Emilia. What the two participants had in common was that they had shared interests with Emilia and they communicated quickly without relying on Emilia to carry the conversation. It is interesting to note, yet again, that Emilia's proficiency assessments relied more heavily

on pragmatic and non-linguistic factors rather than on the target-like structure of the learners' interlanguage.

Concerning the BFI items, Sessions 3 and 4 revealed identical, significant, negative pre- to post-session shifts in Subscale 2 (=conscientiousness), but only Session 4 saw a (highly) significant, positive pre- to post-session shift in Subscale 5 (=neuroticism). The positive shift in Session 4, Subscale 5 was significantly different from the pre- to post-session shifts in both Sessions 2 and 3. The reasons that John became more easy-going/careless in the course of Sessions 3 and 4 (as measured by a negative pre- to post-session shift in BFI Subscale 2) are not obvious, but may relate to John's adjustment to Emilia's comparative lack of compliments and ostensive rejection of his move to contact each other beyond the study. The reason for the highly-significant positive shift in Session 4, Subscale 5, which indicated increased levels of sensitivity/nervousness could be explained by John's realization that he was unprepared for exams and papers due during the week following a long Easter break. During the conversation, John appeared to take stock of his academic obligations and realize the degree to which he was unprepared. This may well have altered his answers to BFI test items such as "I am someone who is relaxed, handles stress well", which are used to calculate Subscale 5.

4.10 SUMMARY OF SHORT-TERM SHIFTS FOR ALL PARTICIPANTS

Before moving on to a discussion of the long-term ID shifts, I have summarized the major pre- to post-session findings for each of the participants and presented them in bullet-point format below in order to be as concise as possible.

Lori

- Showed emergence of informal form of address after a single recast; one of few signs of L2 acquisition in the entire study
- Pragmatic recast (i.e. NS requesting that Lori use informal *tú* 'you') coincided with greatest decrease in AMTB Subscale 1 (=attitudes towards learning Spanish)
- Made many excuses for poor Spanish skills; sessions with fewer excuses showed greater pre- to post-session AMTB shifts
- Positive AMTB shifts coincided with higher, informal, NS proficiency rankings

Sandra

- Session with most interactional LREs coincided with significant, negative pre- to post-session shift in AMTB Subscale 2 (=desire to learn Spanish)
- Use of online tools coincided with a significant decrease in BFI Subscale 2 (=conscientiousness)
- Acceptance of unusual NS apology and request coincided with an increase in BFI Subscale 2 (=conscientiousness) and a significant increase in BFI Subscale 4 (=agreeableness)

Sally

- Spike in LREs coincided with a significant, negative shift in AMTB Subscale 2 (=desire to learn Spanish)
- Think aloud data revealed complex nature of LREs
- Successfully controlling conversation coupled with language play coincided with a greater positive shift in BFI Subscale 1 (=openness)
- Think aloud data mostly negative in tone, revealing fatigue, distraction, frustration, self-deprecation and hopelessness

Casey

- Significant changes in AMTB Subscale 3 (=motivational intensity) positively correlated with LRE frequency, but pattern not as strong as with other participants
- Recast appeared to be particularly detrimental to motivational intensity
- Resolution of stressful situations coincided with significant decreases in BFI Subscale 5 (=neuroticism)
- Cutting meaning negotiations short by feigning understanding coincided with a decrease in BFI Subscale 2 (=openness)

Haley

- Think-aloud data often contradicted chat data, again revealing the complex nature of LREs
- Used sarcasm to deflect feedback; appeared particularly intent on saving face
- Conversational moves and think-aloud comments highlighting NS interlocutor's relative incompetence (and, by extension, participant's relative superiority) coincided with a significant, positive shift AMTB Subscale 3 (=motivational intensity)
- Fewer LREs coincided with a significant, positive shift in AMTB Subscale 3 (=motivational intensity)
- Increased levels on BFI Subscale 1 (=openness) and Subscale 2 (=conscientiousness) coincide with greater numbers of learner-initiated LREs as well as less antagonism towards the NS interlocutor

Jessica

- Extensive think-aloud data allowed for a more in-depth analysis of the nature of metacognitive activity
- Unusually long wait time coupled with NS apology coincided with a significant increase in BFI Subscale 4 (=agreeableness), just as in Sandra's sixth session

Erin

- Only participant not between the ages of 18 and 21
- Highly motivated; studying for bilingual education certification
- Did not exhibit a negative correlation between LREs and AMTB levels; however, recast appeared to have more of a negative impact than other NNS-initiated LREs
- Significant increases in BFI Subscale 4 (=agreeableness) coincided with unusually long wait coupled with NS apology and, in another session, NS apology over not being able to answer participant's question concerning the use of *ser* and *estar* 'to be'
- Backchanneling/pragmatic markers emerged
- Formed relatively close relationship with NS; received high informal proficiency rankings

John

- The lone male participant

- LRE frequency positively correlated with significant shifts in AMTB Subscale 1 (=attitudes towards learning Spanish)
- Formed relatively close relationship with NS; received high proficiency ranking by NS despite relatively low actual proficiency

4.11 LONG-TERM ID SHIFTS

The purpose of this final section of the results is to (1) provide additional information on each of the participants regarding their more global ID trends, (2) illustrate the fractal nature of IDs to the extent that the seemingly orchestrated 'grand sweep' can become 'messy' upon magnification (cf. Thelen and Smith 1996) and (3) present test-retest correlations discussed in Chapter 3.

The following three sub-sections show both the average long-term ID fluctuations for all participants combined (= 'the grand sweep') and then the long-term ID fluctuations for each individual participant. The horizontal axes represent the 8 sessions, the vertical axes represent the average pre-/post-session responses for the given session. Since there were positively- and negatively-keyed items on both the ATMB and the BFI, it would be possible to get a negative average response.

4.11.1 Attitudes and Motivation

Table 27 below indicates a slight, orderly decline in the attitudes and motivation of the group as a whole; this despite the fact that in the short-term analyses, significant positive pre- to post-session shifts outnumbered significant, negative shifts by a factor of 2 to 1. In other words, even though the sessions themselves were usually positively motivating, the overall 16-week trend was downward. The remaining tables in this section show a variety of individual motivational trajectories, including chaotic (e.g. Sandra and John), relatively stable (e.g. Casey, Jessica and Erin), precipitous declines

(e.g. Sandra and Sally), consistently high motivation (e.g. Erin, Jessica and Haley), and relatively low motivation (e.g. Lori).

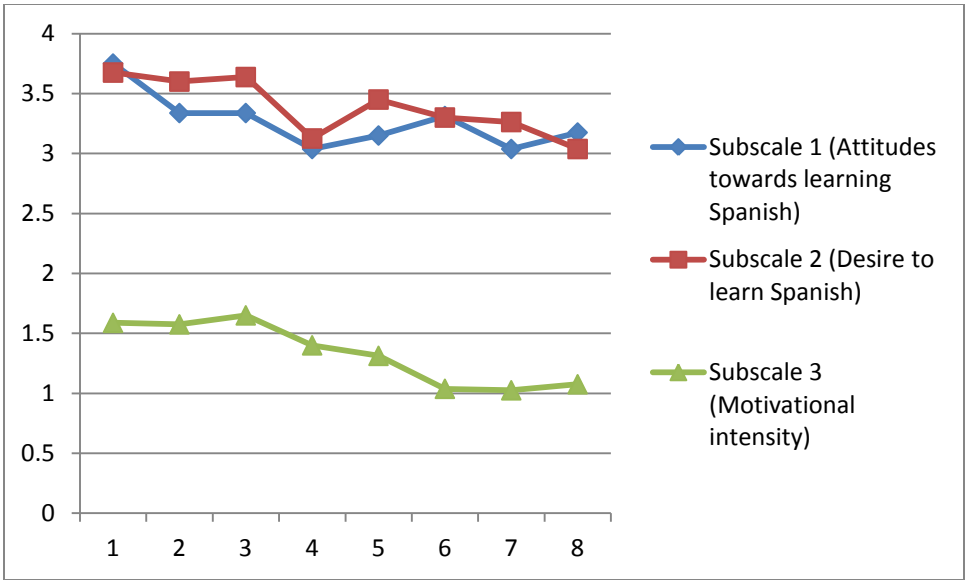

Table 27: Average long-term AMTB shifts for all participants

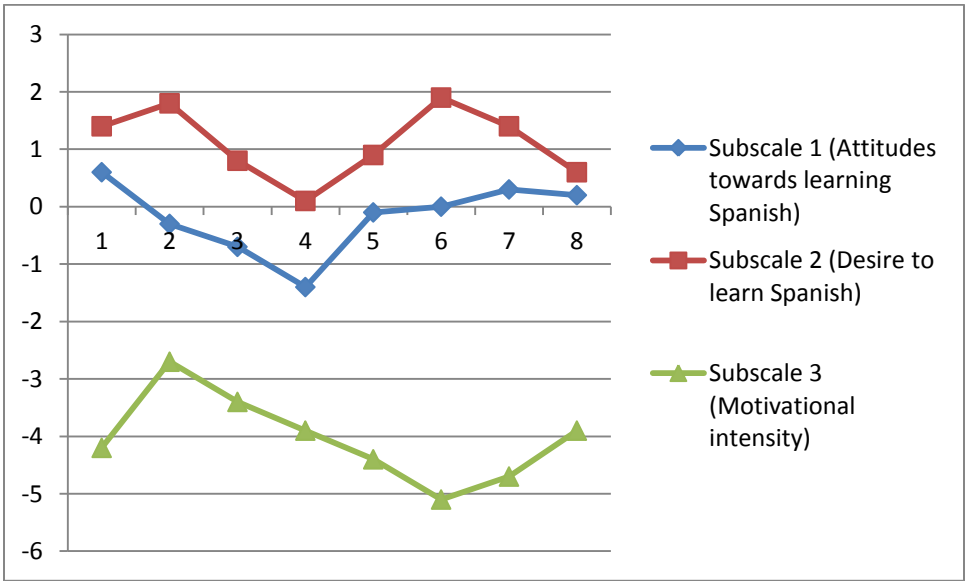

Table 28: Long-term AMTB shifts for Lori

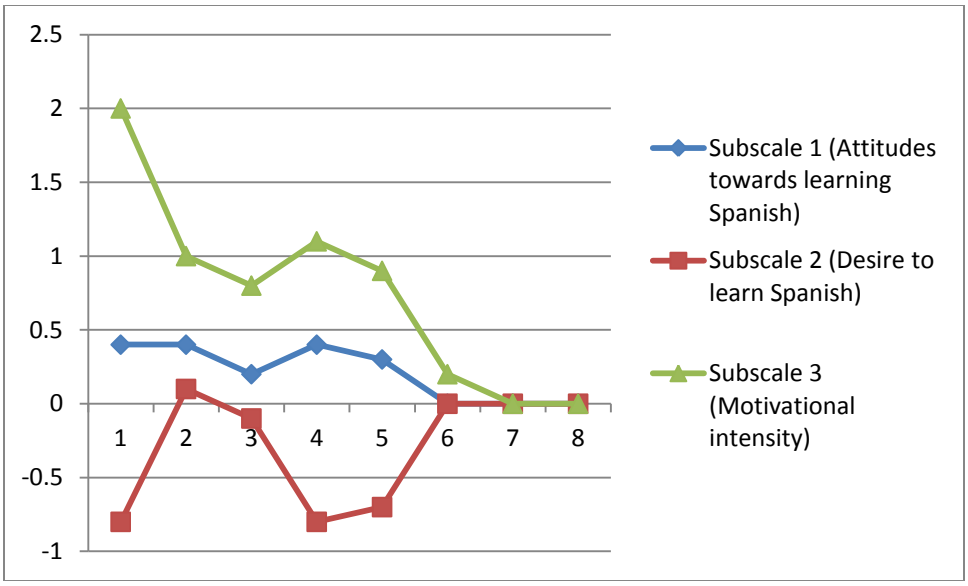

Table 29: Long-term AMTB shifts for Sandra

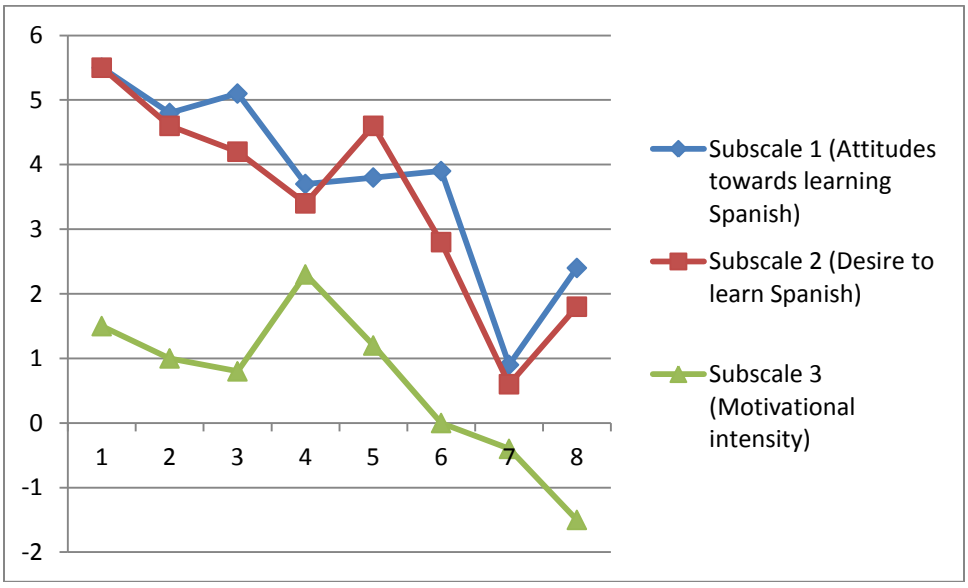

Table 30: Long-term AMTB shifts for Sally

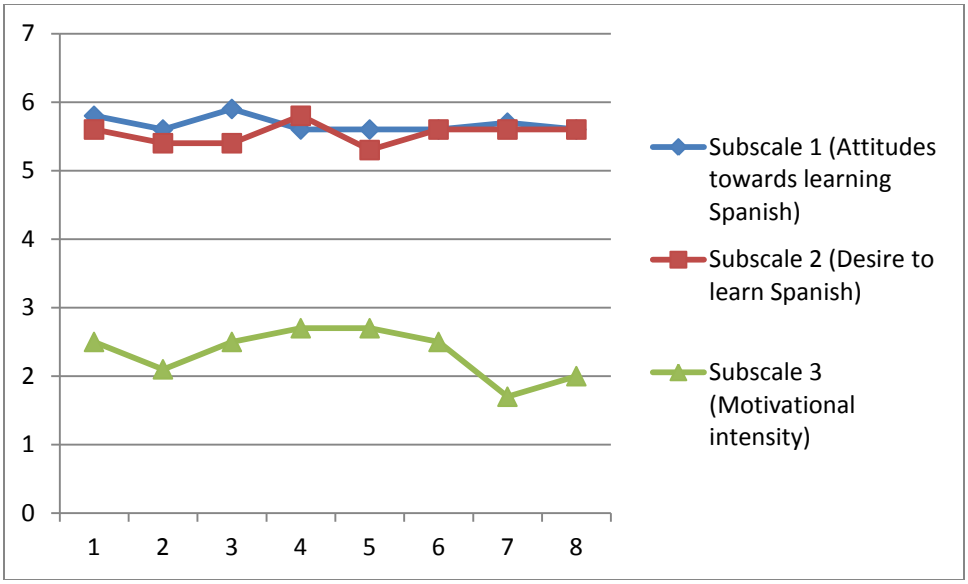

Table 31: Long-term AMTB shifts for Casey

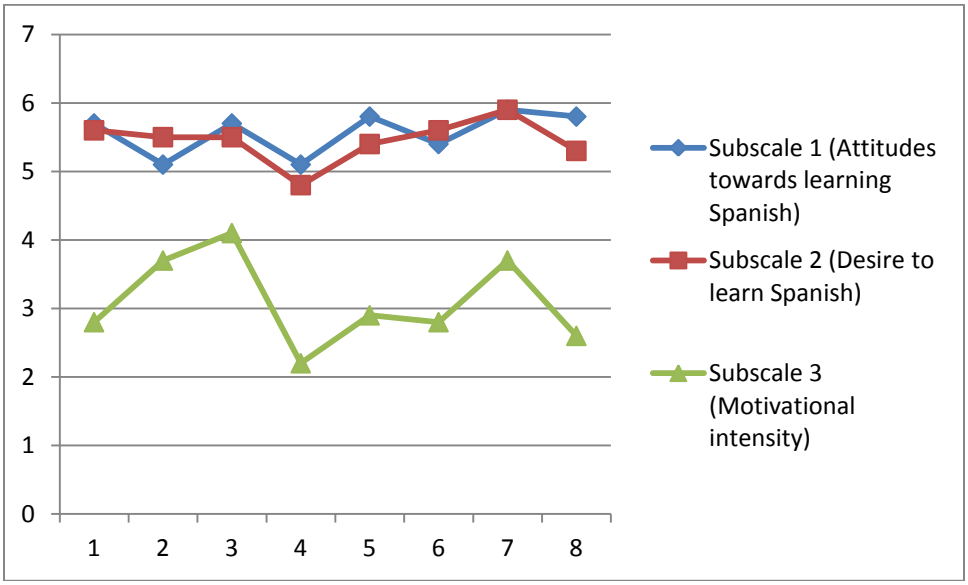

Table 32: Long-term AMTB shifts for Haley

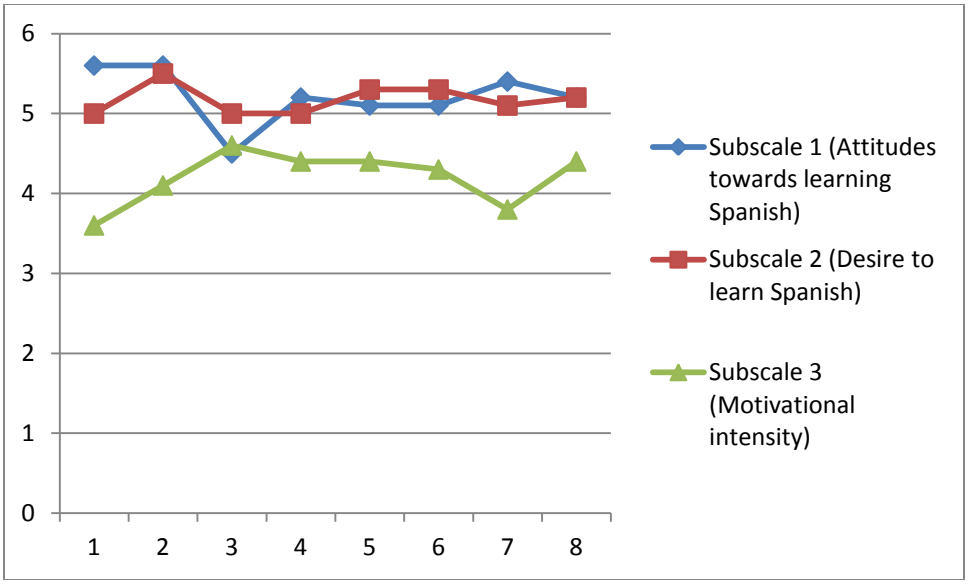

Table 33: Long-term AMTB shifts for Jessica

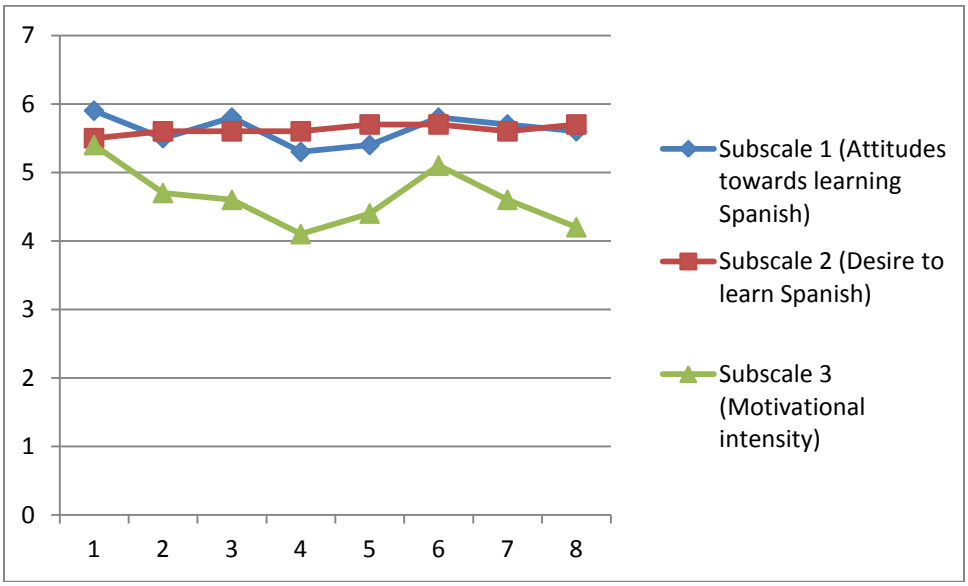

Table 34: Long-term AMTB shifts for Erin

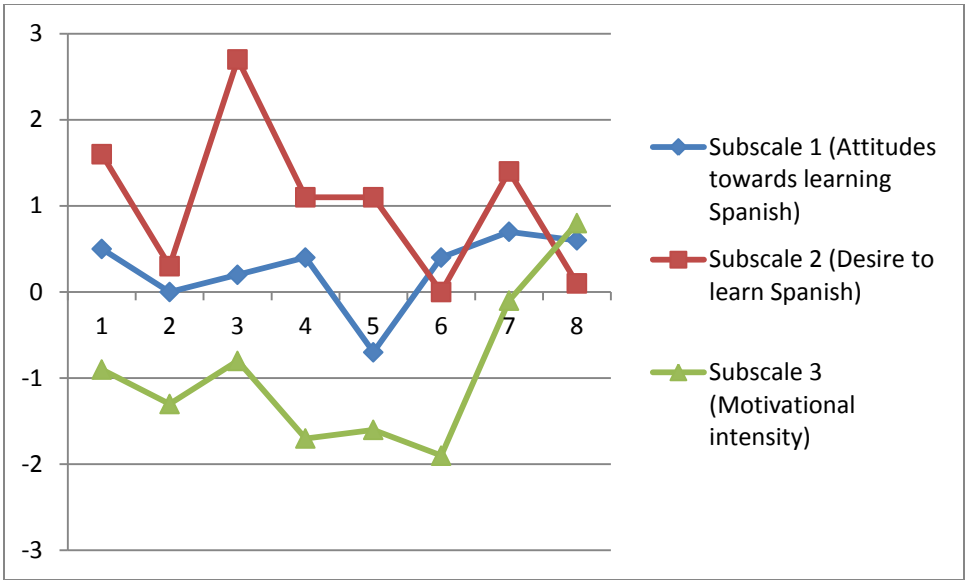

Table 35: Long-term AMTB shifts for John

It should be noted that Motivational Intensity (= Subscale 3) was more often than not lower than the other subscales. The reason for this finding is not readily apparent, although it may reflect that the participants were daunted by the amount of work, or motivational intensity, that normally goes into becoming conversational in a foreign language. Perhaps they still desired results even though they were reluctant to do the work. Put differently, it appears that there may have been a conflict between their idealized, Spanish-speaking selves and the here-and-now (unpleasant) reality of working hard to improve their proficiency.

4.11.2 Personality

Table 36 shows the average, long-term BFI shifts. It depicts the five personality traits as being rather stable over the course of the 8 sessions, with fluctuations remaining within one point on the 5-point Likert scale used to measure BFI traits. The magnitude of

the shifts becomes much more dramatic, however, when we look at each participant individually (see Tables 28 through 35). Sandra, Haley and John show particularly chaotic movement with fluctuations sometimes exceeding 2 points on the 5-point Likert scale. Even those, such as Casey, whose profiles showed consistent trends (=smoother curves), exhibited 2-point shifts. Regarding Case, she dropped two points in Subscale 1 (=Openness) and went up nearly 2 points in Subscale 4 (=Agreeableness). Recall that personality traits are value-neutral, meaning that, unlike Motivation and Reading Span, a 'positive' shift is not necessarily 'better' or more conducive to language learning.

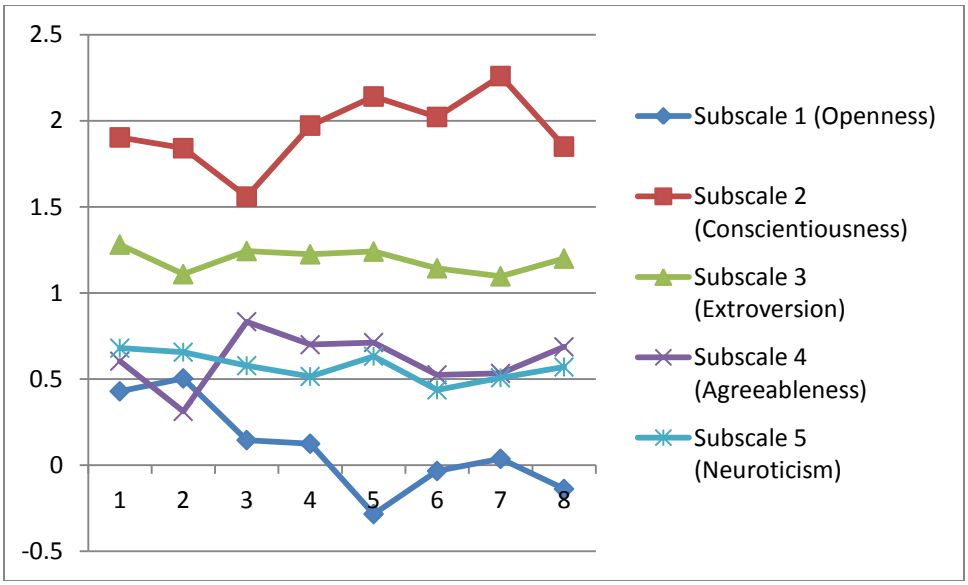

Table 36: Average long-term BFI shifts for all participants

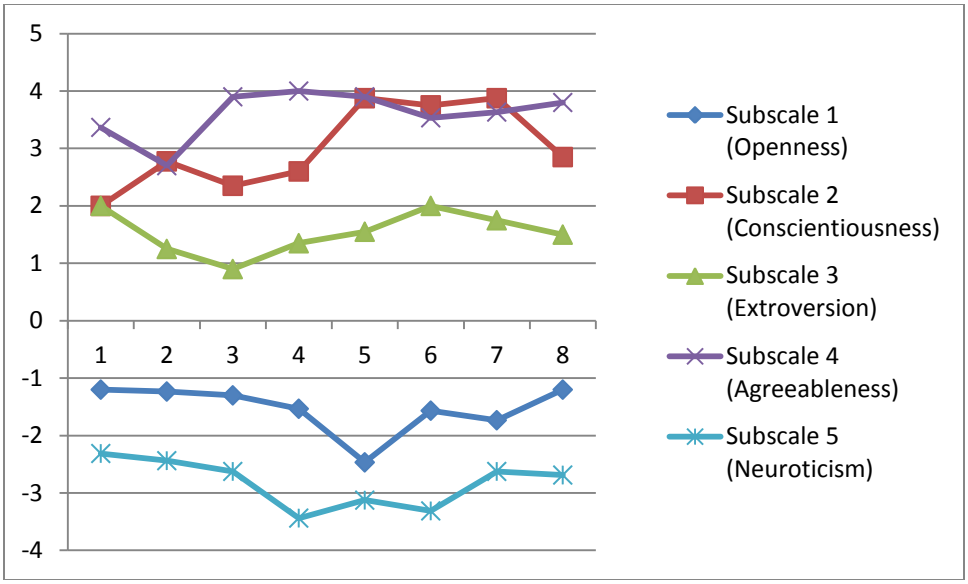

Table 37: Long-term BFI shifts for Lori

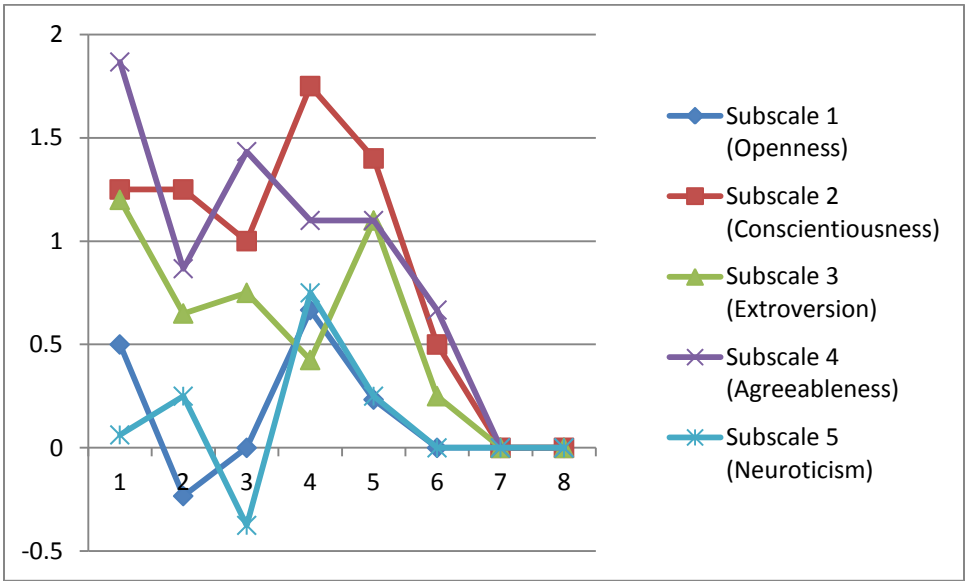

Table 38: Long-term BFI shifts for Sandra

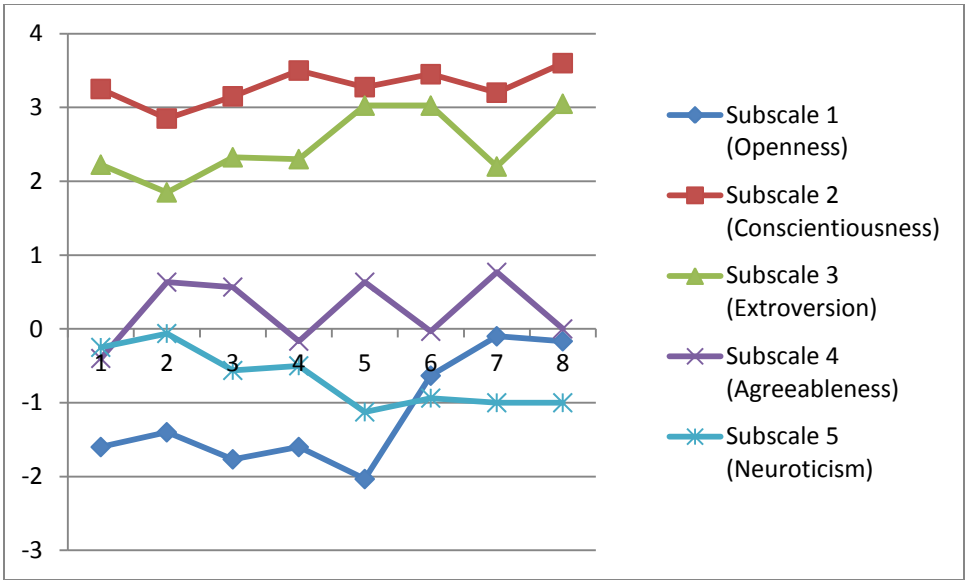

Table 39: Long-term BFI shifts for Sally

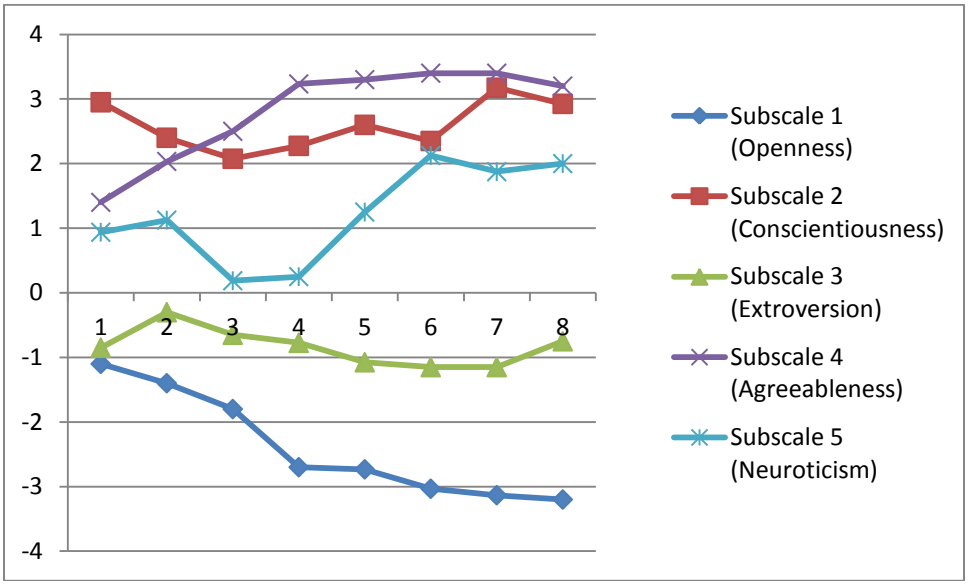

Table 40: Long-term BFI shifts for Casey

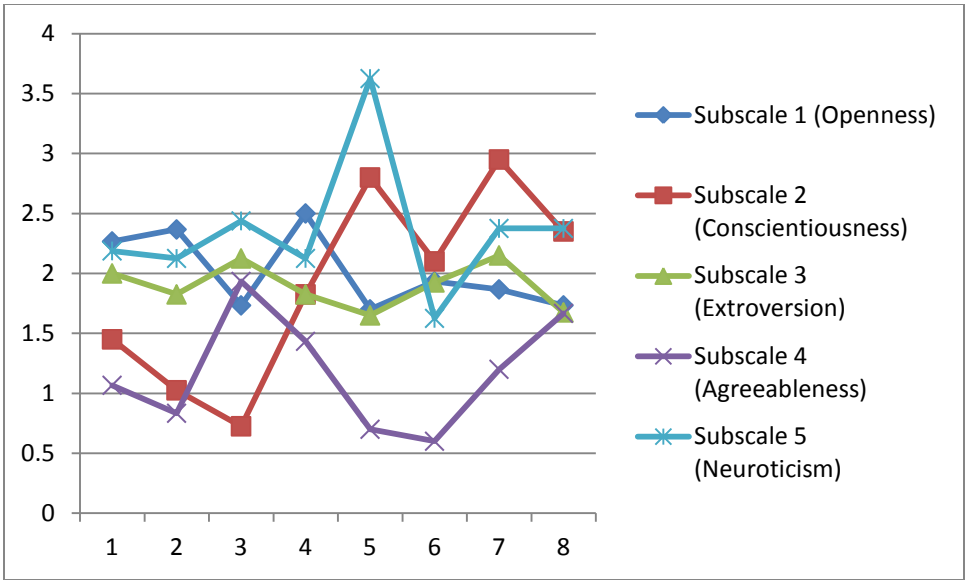

Table 41: Long-term BFI shifts for Haley

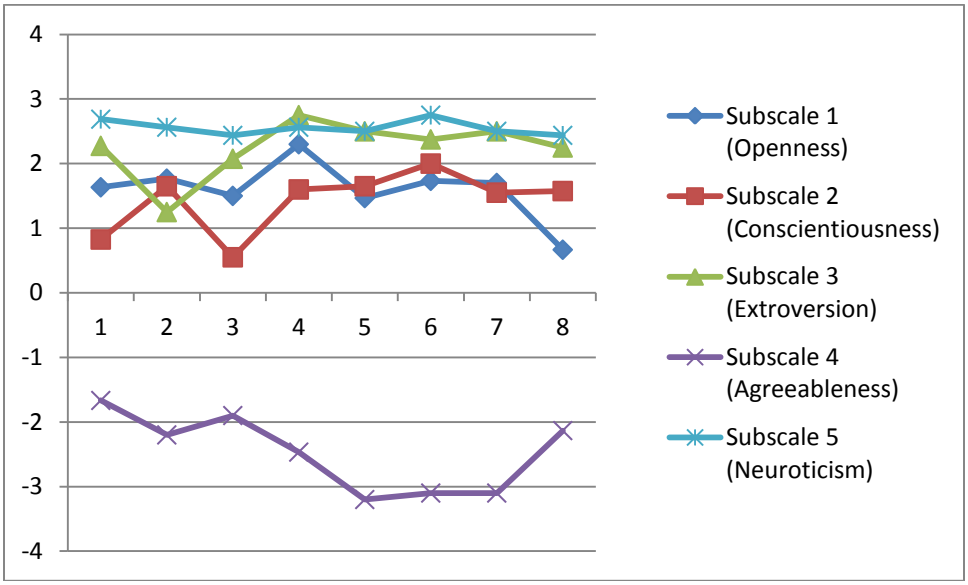

Table 42: Long-term BFI shifts for Jessica

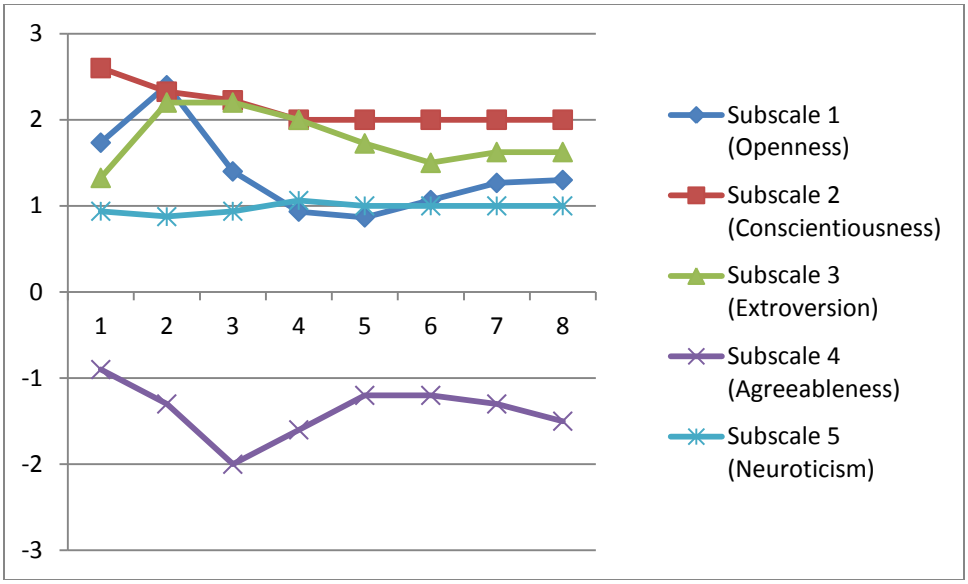

Table 43: Long-term BFI shifts for Erin

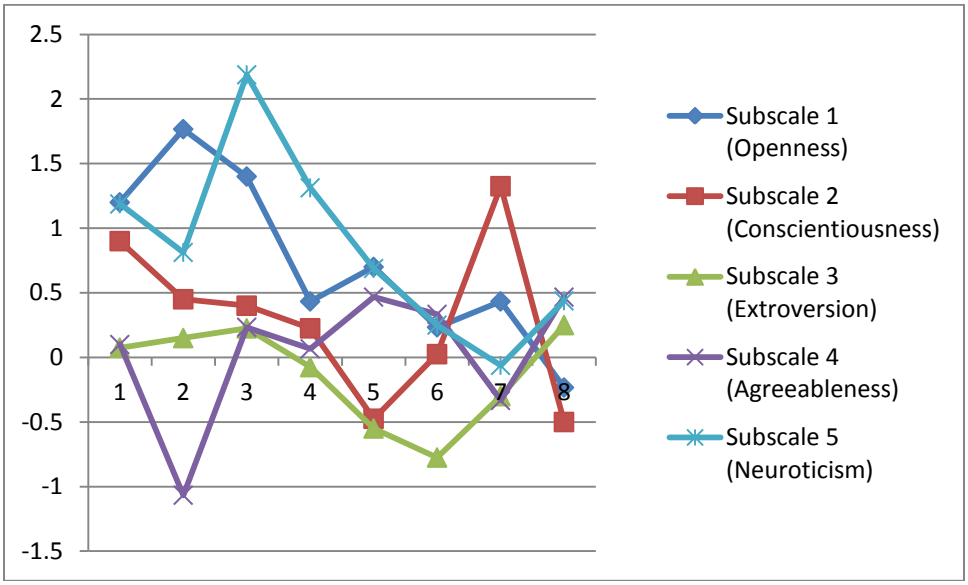

Table 44: Long-term BFI shifts for John

4.11.3 Reading span

As shown in Table 45 below, the overall Reading Span trend was positive, which could be attributable to either an expansion of working memory, or a task effect. If there were a strong task effect, then the pre- to post- session shifts should have been overwhelmingly positive, because the post-test took place less than an hour after the pre-test. Such was not the case, however, as 34 of the 64 total pre- to post-session shifts (=8 sessions x 8 participants) were less than or equal to zero. Therefore, there is little evidence of a (short-term) task effect coupled with a long-term increase, which taken together, might well indicate an overall enhancement of working memory. Whether such an enhancement was the result of language learning or other developments that took place between the sessions is, of course, impossible to say, but it is interesting to note that when positive pre- to post-session shifts did occur, they tended to be of a higher magnitude than the negative shifts. The average negative shift was -0.84, while the average positive shift was 1.1637. In other words, even though a positive, short-term shift was not the most likely outcome, when it did occur, it tended to be nearly 40% greater than the average negative shift. Again, I would argue that these facts point to a limited task effect and they support my hypothesis that even language aptitude indicators are apt to change over time.

As with the ATMB and BFI averages, the smoothness of the average Reading Span curve belies the noticeable dips in individual reading spans (e.g. Sandra, Casey, Haley and John), as well as Casey's rather chaotic Reading Span curve (see Table 49 below).

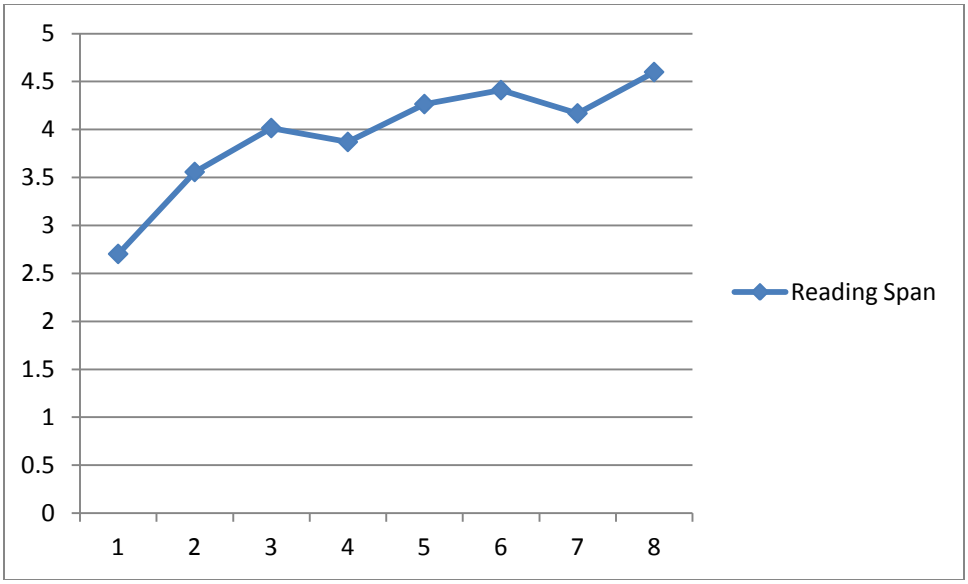

Table 45: Average long-term Reading Span shifts for all participants

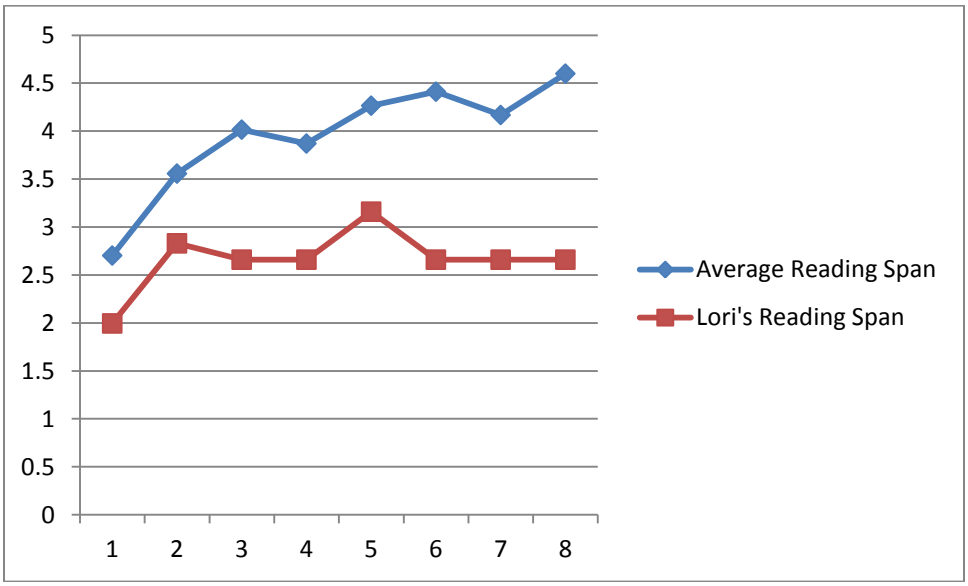

Table 46: Long-term Reading Span shifts for Lori

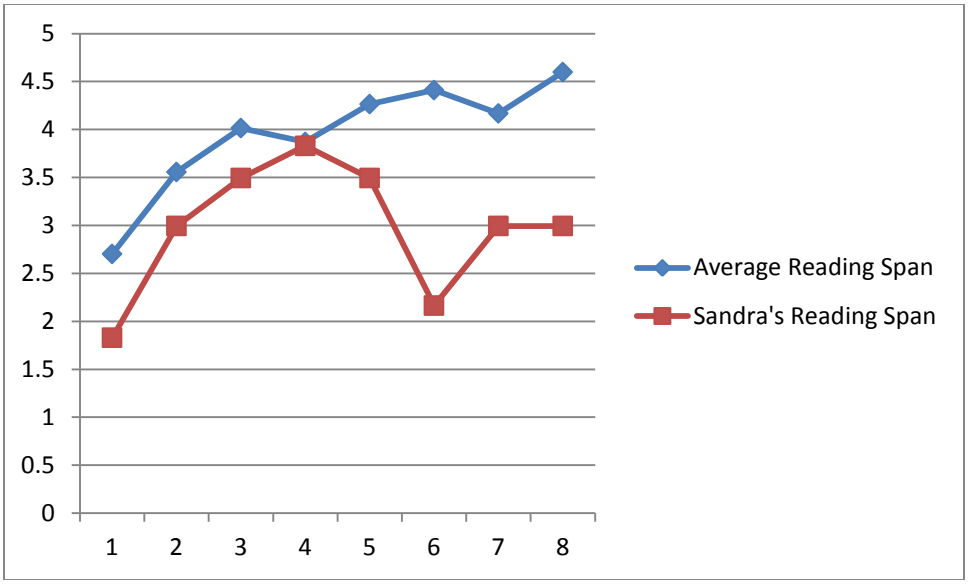

Table 47: Long-term Reading Span shifts for Sandra

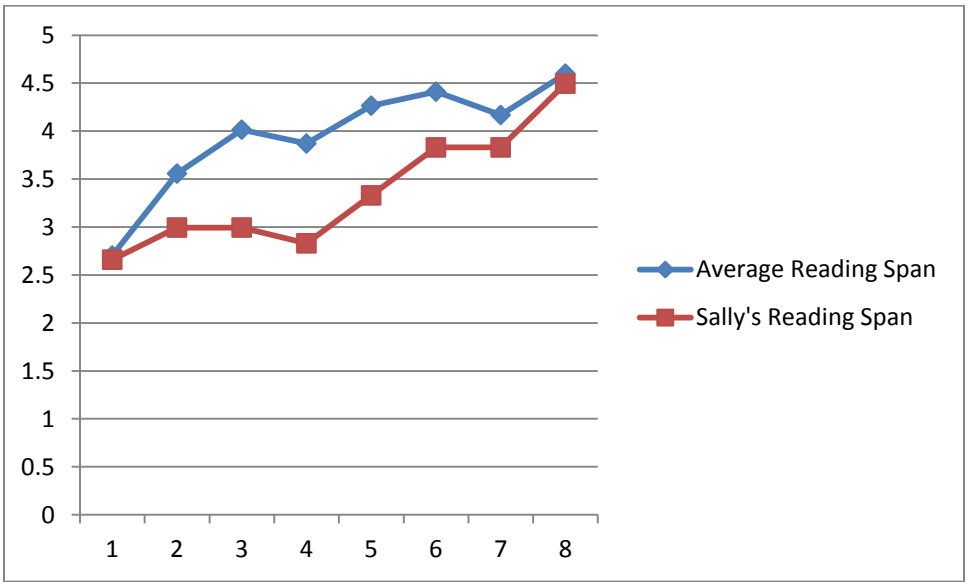

Table 48: Long-term Reading Span shifts for Sally

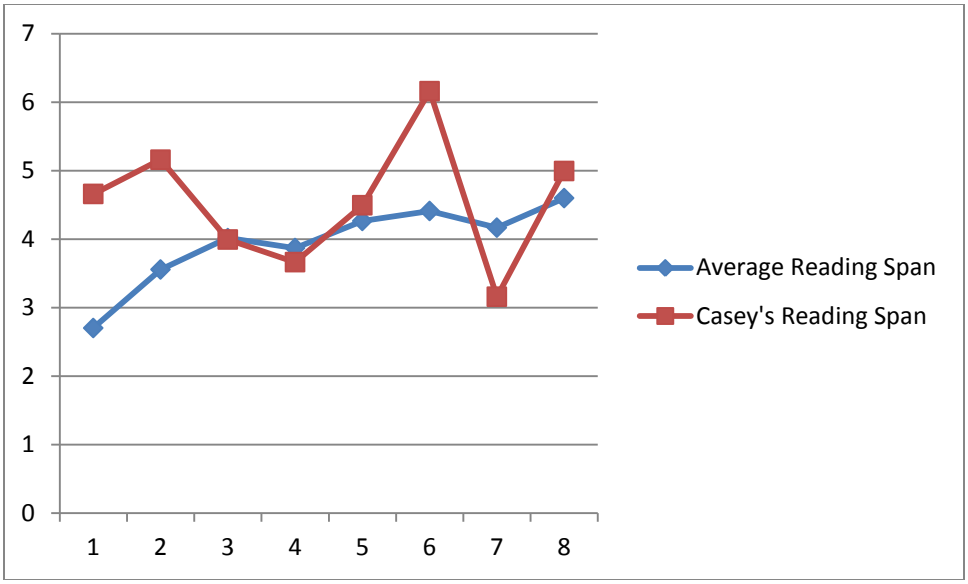

Table 49: Long-term Reading Span shifts for Casey

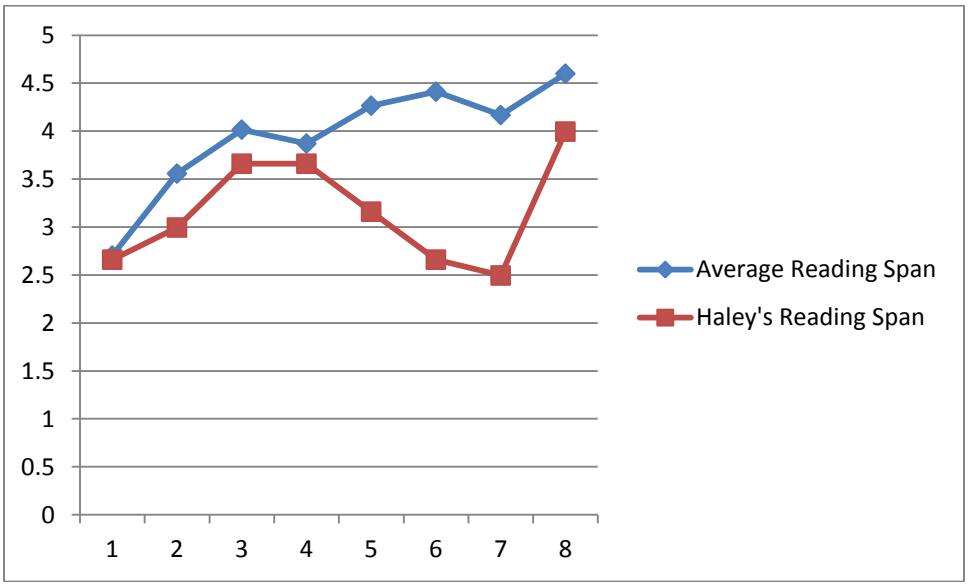

Table 50: Long-term Reading Span shifts for Haley

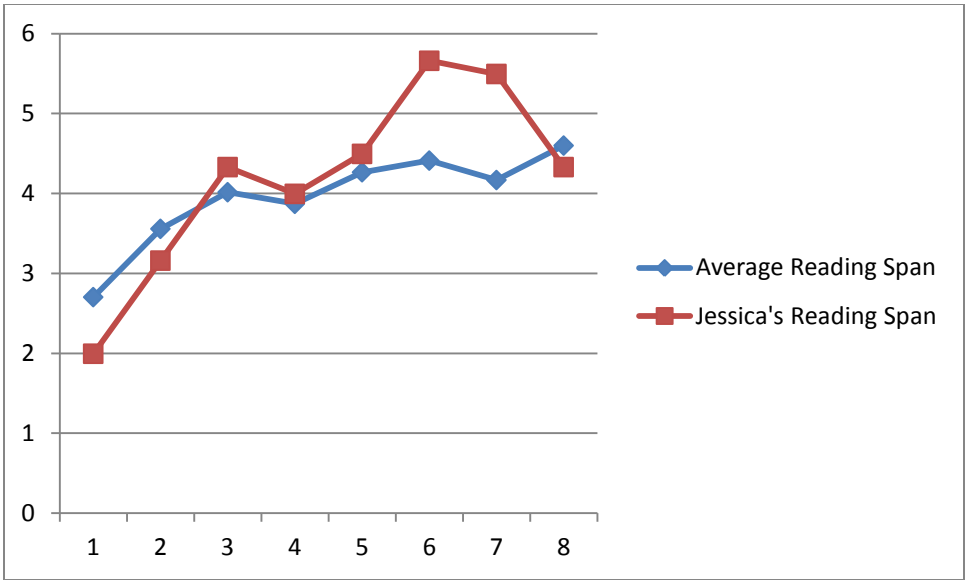

Table 51: Long-term Reading Span shifts for Jessica

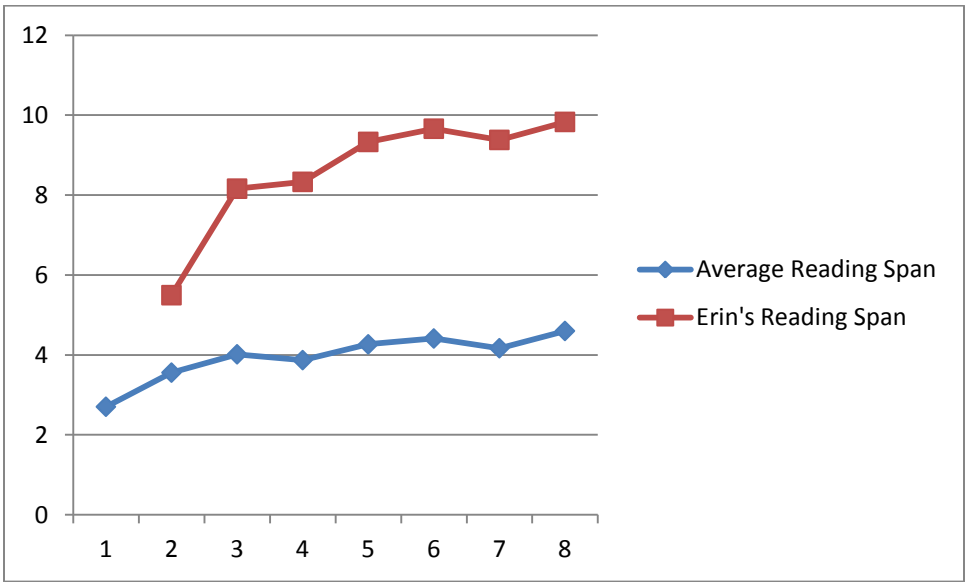

Table 52: Long-term Reading Span shifts for Erin

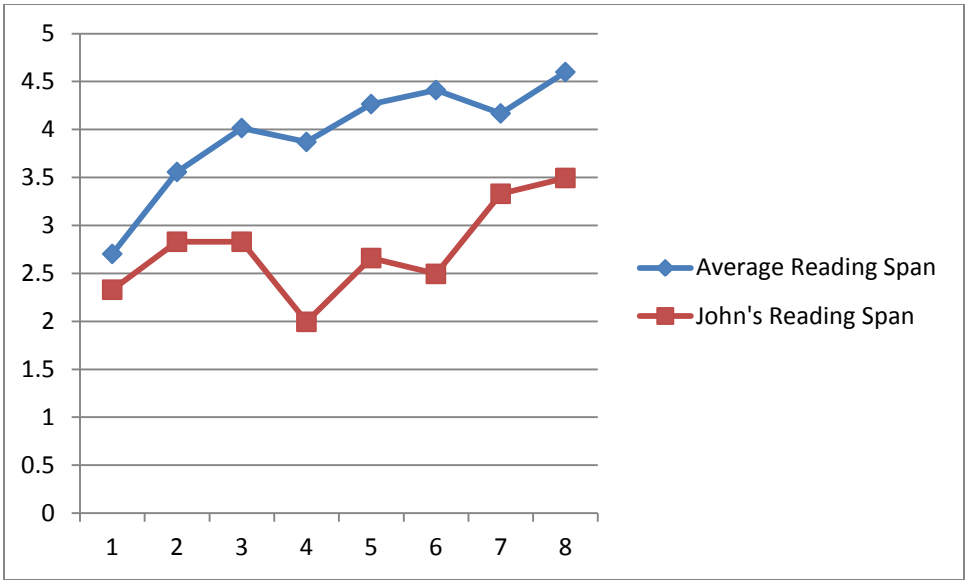

Table 53: Long-term Reading Span shifts for John

4.11.4 Test-Retest Reliability

4.11.4.1 AMTB

Gardner and Smythe (1981) calculated the 6-week test-retest reliability for the AMTB, with values ranging from 0.68 and 0.86 depending of the subscale. Furthermore, Gardner 1985 gave one-year test-retest correlations ranging from 0.51 to 0.75 for eleventh graders in the three subscales measuring 'Attitudes Towards Learning French', 'Desire to Learn French', and 'Motivational Intensity'. In the present study, the 6-week test-retest correlations for Attitudes Towards Learning Spanish, Desire to Learn Spanish and Motivational Intensity were 0.83, 0.91 and 0.96 respectively – far higher than those given in Gardner and Smyth (1981). Such high correlations can be misleading, however, as they *are not* indicative of stable traits. Both the significant, short-term shifts described in the bulk of the current chapter, as well as the long-term shifts depicted in the graphs of

Section 4.11.1, indicate that attitudes and motivation are subject to real changes on every timescale, and are therefore constantly emerging. What the test-retest reliability *does* reveal is that the relative ranking of the participants' levels of motivation remained relatively constant. In other words, the test-retest reliability measured the stability of the measurement *across* the participants and not *within* each of the participants. Once again, we are confronted with the notion that the reality of the aggregate conflicts with the reality of the individual (Thelen and Smith 1996).

4.11.4.2 BFI

John and Srivastava (1999) claimed that three-month test-retest reliability ranged from 0.8 to 0.9 with a mean of 0.85. The mean reliability in the present study was similar (.84), although the range was much larger: 0.89, 0.55, 0.95, 0.87 and 0.91 for each of the five subscales, respectively. Exactly why Subscale 2 (=conscientiousness) was particularly less-reliable is not readily obvious; however, in looking to the short-term (=pre- to post-session) shifts for general patterns that might explain such a deviation, I did come across an interesting finding. Of all of the significant pre- to post-session shifts that occurred (which were discussed on a case-by-case basis throughout this chapter), Subscale 1 (=openness) had 5 positive shifts and one negative shift, Subscale 2 (=conscientiousness) had 5 negative shifts and 1 positive shift, Subscale 3 (=extroversion) had only one negative shift, Subscale 4 (=agreeableness) had 5 positive shifts, and Subscale 5 (neuroticism) had 1 positive shift and 2 negative shifts. It could, therefore be said that if one of these participants were to experience a real personality shift in the course of L2 interaction (of the type carried out in this study), they were far more likely than not to become more open, less conscientious and more agreeable, with

only marginal shifts in extroversion and neuroticism. Again, the relatively low reliability of Subscale 2 (=conscientiousness) belies the facts that (1) it was not more apt that all other subscales to undergo a significant pre- to post-session shift, and (2) the pre- to post-session shifts were unexpectedly unidirectional.

4.11.4.3 Reading Span

Surprisingly, Waters and Caplan (1996) tested the reliability of the Reading Span task among 44 (mostly female, undergraduate) subjects and found the correlation between scores taken at roughly three-month intervals to be 0.41. The present study found a correlation between the Session 1 pre-test and Session 6 pre-test scores (taken at a roughly 3-month interval) to be 0.6276, higher than the correlation found by Waters and Caplan, but still not very reliable. Waters and Caplan also classified their subjects as either low span (i.e. spans of 2.5 and below), medium span (i.e. spans of 3.0 – 3.5) and high span (i.e. spans of 4.5 and above). They noticed that on the two tests, 41% of the 44 participants changed categories, with equal numbers improving and declining. In the present study, 50% of the participants changed categories from Session 1 to Session 6; however, nobody declined. This finding, again, underscores the possibility that language learning could have a positive impact on working memory, to the extent that it is measured by Reading Span, just as working memory may have a positive impact on the language learning process.

4.11.5 Summary

The overarching purpose of this final results section has been to link the present study to previous studies in ID/SLA research and to illustrate that, although the

aggregated data can be harmonious with previous findings (e.g. test-retest correlations), the overall state of affairs is quite fractal in that it reveals strikingly different tendencies upon magnification to the individual level.

Chapter 5: Discussion

5.1 Introduction

The purpose of this final chapter is to respond to the research questions and hypotheses stated in Chapters 2 and 3, summarize and discuss the results of the 8 case studies carried out in Chapter 4 and, finally, propose a non-linear model of the dynamical relationship between the individual and language learning process that might serve as a point of departure for further research.

5.2 Responses to Research Question and Hypotheses

The purpose of this dissertation was to explore the ability of Dynamical Systems Theory (DST) to shed new light on the relationship between the learner and the language learning process in order to answer the research question posed in Chapter 2: Do IDs vary in conjunction with language learning/use, and if so, how?

The hypotheses stated in Section 3.3 were as follows:

> **H1**: The average r-values of the test-retest correlations for the study group will be lower than previously established baseline values (John & Srivastava 1999 [BFI], Waters & Caplan 1996 [Reading Span], Gardner & Smythe 1981, Gardner 1985 [AMTB]), indicating that such correlations may be context-dependent. A natural assumption would be that the context presented in this study is inherently less stable than more highly-controlled laboratory situations, which may entice participants to project a more stable self-image. If this hypothesis is confirmed, it will help explain how IDs can be cast as both stable (as in the literature) and unstable (as in this dissertation), without discrediting either.

This hypothesis was not supported and, in fact, the test-retest correlations for the AMTB and Reading Span (given in Section 4.9.4) were *higher* than the established

baselines. Even though the hypothesis did not hold, I argue that the underlying assumptions still do because the test-retest correlations do not necessarily measure the stability of the trait, but rather the stability of the participant's ranking relative to other participants. In other words, all participants could undergo cataclysmic shifts in a given trait, but as long as they do so to a roughly similar degree, then the test-retest correlation remains high. That does not necessarily mean, however, that the underlying trait is stable.

In Chapter 4, the results of the present study revealed significant short-term (pre- to post-session) shifts in all subscales except Reading Span, but even the Reading Span revealed measurements that were significantly different from one another. Moreover, the long-term shifts that occurred throughout the span of the eight sessions depicted noticeable changes over time, often involving shifts of several points on the Likert scales used to measure the given IDs (see Sections 4.11.1 – 4.11.3). The fact that most of the short-term shifts were unidirectional was an interesting finding that merits further investigation.

> **H2**: A participant's pre- and post-interactional ID profiles may measurably and significantly fluctuate within the span of a single interaction, after measurement errors are taken into account.

This hypothesis was repeatedly supported. Each participant experienced significant pre- to post-session shifts in one or more of their AMTB and BFI subscales during the 8 sessions. Again, the Reading Span seemed to be the least affected scale, even though it yielded measurements that were significantly different from one another as well as noticeable long-term trends.

> **H3**: Those sessions with significantly positive ID shifts will be qualitatively different in terms of language-related episodes, conversation management and pragmatic markers, and metacognitive markers from those with significantly negative ID shifts. Results will vary among participants. This hypothesis looks at each participant as an individual case study and does not attempt to aggregate the interaction data nor the results of the ID tests among participants.

I argued throughout Chapter 4 that this hypothesis was repeatedly supported. AMTB contrasts were systematically reflected in the number and quality of LREs (discussed in greater detail in Section 5.3 below), and BFI contrasts could often be explained in terms of unusual speech acts or other events. For example, Haley's increased levels of openness and conscientiousness (=BFI Subscales 1 and 2), which would indicate heightened inventiveness/curiousness as well as efficiency/organization, coincided with greater numbers of learner-initiated LREs as well as less antagonism towards the native-speaker interlocutor (see Section 4.6.2). Additional patterns were found in the cases of Sandra (see Section 4.3.2), Sally (see Section 4.4.2), Casey (see Section 4.5.2), Erin (see Section 4.7.2) and John (see Section 4.8.2).

> **H4**: Overall, the data will be so idiosyncratic and fractal that no linear patterns (e.g. greater meaning negotiations = greater integrative motivation) will be true for all participants in general. Of course, it would strengthen the claims made in this dissertation if a particular interaction between IDs and certain discursive features were strong enough to hold across all participants and this hypothesis were rejected. Still, I see that as an unlikely scenario. Either way, however, this hypothesis merits testing.

Surprisingly, this hypothesis was rejected, as several patterns emerged among the participants. These patterns are discussed in the following section.

5.3 SUMMARY OF ADDITIONAL FINDINGS

The individual findings were summarized at the end of each of the case studies in Chapter 4. What follows are the findings that were common to many if not all case studies.

5.3.1 LREs and Attitudes/Motivation

The most noticeable pattern was the fact that, except for perhaps Erin and Lori, all participants demonstrated a negative correlation between LRE frequency and pre- to post-session shifts in one or more AMTB subscales. John's case (see Section 4.9) provided particularly compelling evidence for the negative relationship between attitudes/motivation and LREs because it allowed for a direct comparison between a significant increase and a significant decrease in the same subscale (i.e. attitudes towards learning Spanish). Each of the participants exhibited different tolerances for LREs: Haley (see Section 4.6) had a relatively high tolerance for LREs, whereas Sandra (see Section 4.3) did not.

The data also suggested that different LREs impact the learner's psyche in different ways or to different degrees. For example, in Casey's first and fourth sessions, she initiated 2 translation requests and one meaning negotiation. Additionally, the later session contained the only instance of a recast (issued by the NS interlocutor), which appeared to trigger a significant pre- to post-session decline in her 'motivational intensity' (=AMTB Subscale 3) (see Section 4.5.1). Thus the presence of recasts in particular (but not necessarily other, learner-initiated LREs) was more likely to signal a dip in one or more AMTB subscales.

Even Erin, whose pre- to post session ATMB shifts were *not* negatively correlated with the number of LREs contained within the sessions, illustrates this point. Session 4

(see Section 4.8.1.1), with a significant increase in Subscale 3 (=motivational intensity), actually had three times more LREs than Session 7 (see Section 4.8.1.2), which had a significantly lower shift in the same subscale. However, one of the two LREs in Session 4 was a recast, whereas all of the LREs in Session 4 were initiated by Erin. I would argue that the apparent contradiction could be explained in terms of face. Erin's desire to be a Spanish teacher, coupled with her eagerness to initiate LREs, her camaraderie with Emilia and her gratitude for Emilia's help, could indicate that Erin simply did not view LREs as face-threatening as the other participants did. Perhaps unsolicited LREs were slightly more threatening, which might explain the (non-significant) negative pre- to post-session shift in Session 7.

It therefore appears that overt LREs in general, and NS-initiated LREs in particular, often defined as activities that lead second language learners to 'notice the gap' or 'restructure' their interlanguage (cf. Lightbown, Spada & Wallace 1980), may have negative consequences in those motivational factors that actually regulate the attentional resources devoted to such restructuring.

5.3.2 The complex nature of LREs

There was repeated evidence that many, if not most, episodes in which the participants were focused on forms were *non*-interactional. In fact, in many instances, participants avoided initiating an LRE, even though doing so might have been the easiest way to resolve any doubts and learn new forms. In Session 7, Sally admitted that she did not know how to issue an apology, so she would indicate laughter instead (see Section 4.4.1.1). This finding would suggest that 'learners' are not exclusively interested in 'learning', at least if 'learning' constitutes an unacceptable threat to face or footing.

It may well be that canonical, overt LREs that are visible within the interactional data are simply a subset of LREs that, driven by the need to maintain the flow of conversation, overwhelm a learner's desire to save face. Perhaps canonical LREs should be reframed as but one possible manifestation of interaction-motivated focus on form: not to downplay the value of immediate, NS feedback, but rather to weigh the importance of such feedback against the concomitant negative threats to face (which would occur not only when the learner hears the feedback, but is also expected to reply with thanks or excuses). This perspective seems reasonable for learners to take when deciding whether or not to expose their interlanguage deficiency by initiating an LRE. Of course, when the interlocutor initiates the LRE due to a learner's (inadvertent) non-targetlike production, then the only non-offensive countermeasure a learner can take would be to say that they have understood the feedback, when in fact they have not. Regardless of the outcome of an LRE (be it canonical or otherwise), I would argue that the sometimes opposing forces that shape them are the same and that *no* LRE is guaranteed to result in meaningful feedback (as was noted in Session 8 [see Section 4.4.1.2]).

From the interlocutor's perspective, the boundaries of LREs can be equally as elusive. In Sally's second session (see Section 4.4.2.2), for example, the same meaning negotiation that began the session periodically resurfaced throughout the session and was eventually used as a closing point for the conversation. The recurring LRE was not motivated by additional NNS 'errors', but presumably the native speaker's desire to reinforce the original LRE and lend consistency to the interaction. If a NS can skew the natural frequency of a lexical item to reinforce a particular LRE, then where exactly is the boundary of the LRE? With each successive use of the word *olvidar* 'to forget' in Session 2, its corresponding LRE became an obvious subtext of the conversation as well as a matter of language play. So not only did the LRE have an unclear boundary, but it

was also multifaceted in that it served as both a tool of instruction and humor, both a break in the flow of the conversation and a means of maintaining the thematic consistency of the conversation. Thus the nature of the LRE as revealed through these sessions is indeed fractal and its contour is as elusive as the length of the British coastline (cf. Mandelbrot 1967 [discussed in Section 1.2]).

5.3.3 BFI indicators and Unusual Speech Acts

Personality indicators, but not necessarily attitudes/motivation, may be susceptible to NS apologies/excuses and major deviations from routines and learner expectations. This pattern was illustrated in Sandra's sixth session (see Section 4.3.2.2), Erin's seventh session (see Section 4.8.1.2) and Jessica's second session (Section 4.7.2.1. In all three cases, the participants were made to wait an unusually long time for Emilia to enter the session, and then had to deal with an unusual speech act. All three responded favorably (or at least *not* unfavorably) to Emilia's apology, made no derogatory comments in the think-aloud protocol, and showed a subsequent, significant upswing in their (perceived) levels of agreeableness.

Erin's second session also saw a significant pre- to post-session increase in her self-reported levels of agreeableness (see Section 4.8.2), even though it was not stifled by technical difficulties as was her fourth session. Instead, Emilia was apologetic for not being able to answer Erin's questions concerning the proper use of *ser* and *estar* 'to be'. After repeated, failed attempts at clarifying the distinction, Emilia concluded, "*al respecto con 'son' y 'estan' lo ignoro, pero consulta con el profesor. Estoy segura que el te dara mejor informacion*" 'with respect to "*son*" and "*están*", I don't know it, but consult with the professor. I'm sure that he will give you better information' (10:54).

Erin's response was simply, "*bueno*" 'good', which she did not elaborate upon in the think aloud data. Emilia issued two other apologies during the sessions for typographical errors, but this final LRE appeared to require the most acquiescence (or agreeableness) on Erin's part.

Perhaps these shifts are due to the participants forgiving, consciously overlooking, or otherwise relinquishing their right to be frustrated by the interlocutor's tardiness, technical issues, and/or inability to explain particular forms. None of the think-aloud comments during these episodes were indicative of any anger or excessive frustration, even if the participants felt that they had a right to be upset.

One other unusual event that appeared to impact a BFI subscale was Sandra's use of online translation tools in her fifth session (see Section 4.3.2.1), which led to a substantial increase in Emilia's estimation of her proficiency but also a sharp decrease in her self-reported level of conscientiousness (=BFI Subscale 2).

5.3.4 The Discourse – Metacognition Interface

At times, the think-aloud and text data complemented one another, but in many instances, they actually contradicted one another. In Haley's second session (see Section 4.6.1.1), her think-aloud amplified her unfriendly conversational moves. Her blunt acceptance of Emilia's apology, the fact that she did not accept Emilia's invitation to initiate an LRE, and the fact that she did not initiate topics of conversation even after pauses as long as three minutes all pointed to the fact that she was not trying to establish solidarity with Emilia. What the think-aloud data revealed were repeated, harsh criticisms and frustration over Emilia's slowness and a poor memory of her personal details (even though Haley demonstrated during the think-aloud that her own memory of

Emilia was not that clear, either). It appears that Haley was using sarcasm and conversational moves to limit and deflect feedback and maintain a higher footing than the expert-novice frame might normally entail. It may be for this reason that her attitudes and levels of motivation were less responsive to LREs than those of others who readily accepted the novice role.

Haley also repeatedly indicated that a breakdown had been resolved when in fact it had not (see Section 4.6.2.1.1, for example). In Session 7, Sally admitted in the think aloud that she did not know how to issue an apology, so she indicated laughter instead (see Section 4.4.1.1).

5.3.5 Proficiency as an emic construct

Evaluations of John and Erin provided evidence that Emilia's proficiency rankings were predicated on conversation management skills, such as fluency and rapid turn sequences, and non-linguistic factors, such as shared interests, as opposed to target-like formal accuracy. Recall that John was in second-semester Spanish and made far more 'errors' than Erin, who was in seventh-semester Spanish. Still, Emilia gave them both very high proficiency marks: up to 8 out of 10 possible points. John's girlfriend was Peruvian and he demonstrated a keen interest in Peruvian literature. Erin, who was nearly Emilia's age and also had children, made plans to meet with Emilia in Florida after the study. Even though Emilia was instructed to rank their proficiency, it appears as though she confounded the closeness of the relationships she developed with some of the participants with their linguistic ability. Moreover, participants such as Lori (see Section 4.2) demonstrated that attitudes and levels of motivation often go hand in hand with proficiency rankings, a fact that would suggest that attitudes and levels of motivation and

NS estimations of proficiency are overtly conveyed in the interactions. It would, therefore, be interesting to consider the extent to which 'proficiency', to the extent that it is usually operationalized as 'target-like linguistic performance', is an authentic, emic construct.

5.3.6 Emergence of Pragmatic Markers

Spanish pragmatic markers, especially the *ja*, invariably emerged in the talk of all participants through the course of the 8 sessions. Only in very few instances did the participants resort to the English (orthographic) equivalent once they had been exposed to the corresponding Spanish form. Some cases were limited to the *ja*, while other cases, such as Erin's and Lori's, showed evidence of more extensive learning of pragmatic markers. Erin's forth session (see Section 4.8.1.1) illustrated the emergence of pragmatic markers, such as *guau* 'wow' and *igual yo* 'me too'. Lori never used the formal *usted* pronoun after Roberto called her attention to it in her sixth session (see Section 4.2.1.3). No other class of forms showed such systematic and regular uptake as these pragmatic markers.

5.4 ORDER FROM INSTABILITY

In Section 1.7, I argued that IDs had been mischaracterized in the literature as inherently stable, which made them particularly interesting from a DST perspective. Most of this dissertation has, in fact, been dedicated to illustrating the degree to which IDs can vary. The data and the preceding discussion revealed several other patterns, or points of relative stability in the agent-language interface, which should not be misconstrued as stable *per se*, lest we fall into the same "old ways of thinking" (Larsen-

Freeman & Cameron 2008, Dörnyei 2009) (see Section 1.7 for original reference). Indeed, DST provides means of describing not only variability, but also patterned outcomes as systemic responses to an 'attractor'; that is, a point, curve or set about which a dynamic system revolves over time. An example of a very simple attractor is called a 'point attractor' and it can be observed using a pendulum. No matter at which point the pendulum is released, it will orbit about and eventually come to rest at a point at which it is perpendicular to the earth.

More complex attractors naturally entail more complex processes. The most notable among these, according to Peitgen et al. (2004), are called 'feedback processes' (or dynamic laws as first proposed by Sir Isaac Newton and Godfried Leibniz). They result when the same operation is repeated many times with the output from the previous iteration becoming the input for the following. Even when the operation involves random (=chaotic) functions, astonishing patterns can arise. Peitgen et al. illustrate this quite well using the so-called 'Sierpinski triangle', or 'chaos game'. The game consists of generating a random set of numbers between 1 and 3: {2, 1, 3, 1, 2, 1 …}. A triangle is then drawn with the vertices labeled 1, 2 and 3. Then, a beginning point is chosen at random, and a dot is placed at a new point half way between the first point and the first number in the random set (=2). Another dot is placed half way between the second point and the second number in the random set (=1), and so on. The result for the first thirty dots in the random set is illustrated in Figure 5.

Figure 5: Chaos game – 30 iterations[12]

This pattern would be best described as chaotic. However, if we repeat the function hundreds, or even thousands of times, the following image results.

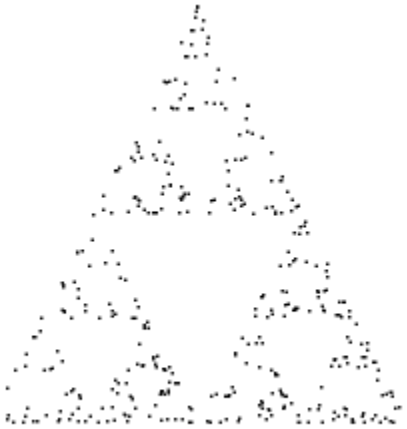

Figure 6: Chaos game – 400 iterations[12]

[12] From John Carrroll University (n.d.). Mathematical vignettes: Glimpses of the world of mathematics. Retrieved April 10, 2012 from http://www.jcu.edu/math/vignettes/chaosgame.htm .

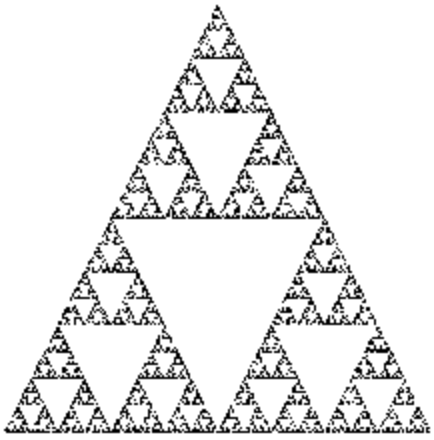

Figure 7: Chaos game – 30,000 iterations[12]

This is a visual representation of an attractor. Notice that with a very simple iterated function, the position of the next dot cannot be predicted (other than probabilistically), but the resulting shape is quite deterministic. Consequently, this attractor can also be viewed as linking variation with order, or chaos with complexity.

Research on attractors has also been carried out in the social sciences. For example, Combs (1994) linked mood swings to attractors. Additionally, Cooper (1999) investigated how attractors shape language, even proposing an attractor-based grammar, and De Bot et al. (2007) reviewed other studies in language acquisition and attrition that hint at possible attractors. These studies involve vocabulary acquisition rates and even modeled networks where attrition is simulated by deactivating certain lexical items within the network.

A critical lesson to be learned from research on attractors is that they exist within a certain phase space, or set of possible states in which the system can exist. If the parameters of the system are altered, so too is its phase space. Attractors are, therefore, not static, but dependent on the nature of the system itself. To illustrate this point,

consider an eddy within a stream as part of an attractor that can appear quite stable. If the rocks in the streambed are rearranged or if the water volume or state changes, however, then the attractor is no longer apparent. Along these lines, Larsen-Freeman (2007) argued against language fossilization being treated as an end state. She maintained that in a dynamical process such as language acquisition, there are neither ends nor states. Fossilization, thus, could be viewed as an attractor, which could be overcome given a different set of inputs.

It could, therefore, be said that the current study revealed (unanticipated) attractors, or points of relative stability. The contour of the attractors and the degree to which they arose out of contextual factors unique to this study remains to be seen. With respect to the relationship between motivation and LREs (see Section 5.3.1), for example, I would hypothesize that interacting in a foreign language with a native-speaker has the potential to make a learner feel anxious and vulnerable, which, in turn, would heighten the learner's sensitivity to face threats. When the native speaker exposes the learner's target-language deficiencies, particularly through NS-initiated recasts, the learner is particularly apt to save face, even if doing so 'short-circuits' the learning process. This phenomenon could be part of an attractor: under certain circumstances, NS-initiated feedback will tend to 'pull' a learner towards a state of disengagement in order to save face just as gravity pulls a pendulum towards a particular state of rest – the more (direct) the feedback, the more the learner approaches disengagement from the language learning process.[13]

Yet another attractor, or set of attractors, is evidenced by the relative degrees of variability within each of the IDs. Of the 320 pre- to post-session BFI shifts measured,

[13] This phenomenon could alternatively be viewed as a 'repeller', which is essentially the opposite of an attractor. Rather than drawing a system towards a particular state, the repeller (in this case NS-initiated feedback) would push the system away from a state (i.e. a state of engagement).

21 (= 6.56%) were significantly 'positive' or 'negative', making personality the most likely ID to undergo a significant, short-term shift among the participants in the current study. Of the 192 pre- to post-session AMTB shifts measured, 12 (= 6.25%) were significantly positive or negative, making attitudes/motivation the second most likely ID to undergo a significant, short-term shift. Reading Span came in a distant third, with no significantly positive or negative shifts, making it the most stable of the three IDs measured. It should be noted, however, that this apparent stability could be exaggerated by the fact that there were only 64 Reading Span shifts measured, as opposed to 192 AMTB shifts and 320 BFI shifts. Reading Span had fewer data points because it was measured using a single scale, whereas the other IDs comprised multiple subscales. In any case, Reading Span was not *completely* stable, given the fact that participants exhibited shifts that were significantly different from one another, if not significantly positive or negative in their own right.

While it is quite tempting to overgeneralize patterns and overestimate their predictive values, we must never ignore the set of circumstances in which they hold. Would the learners have responded in the same manner if the NS were a classroom instructor? What if the learners and NS interacted in both the native and target languages and *both* had the opportunity to initiate recasts? What if the learners had different cultural/linguistic backgrounds? The attractor is not, therefore, inherently stable, but rather an optimalized solution to a given set of parameters, which are themselves subject to change. The hallmark of a dynamical system is its variability over time and the (distant) future of a language learner remains elusive no matter how much we wish it were not so. Of course, DST has provided fields such as meteorology with powerful predictive models, but the consistency of such models usually begins to decrease

exponentially beyond the immediate future. The extent to which SLA will benefit from analogous models is as yet unclear.

5.5 THE PROMISE OF DST

One of the aims of this dissertation was to consider potential applications of DST to the quasi-experimental study of SLA. In Section 2.2, I summarized several of Ellis and Larsen-Freeman's (2006) maxims (or 'morals') that were meant to guide future dynamical SLA research. Below, I have restated them and used them to evaluate the present study. [14]

MAXIM 1: No 'magic bullet' to acquisition. The present study does not propose any single factor that is the sole cause for acquisition. Indeed, I do propose that many forces that are generally thought to contribute to language acquisition (e.g. LREs) are often mediated by opposing, counterproductive forces (e.g. face-saving strategies).

MAXIM 2: 'Multivariate causes' and non-linearity. The data from the present study suggested that a wide range of factors bear on self-reported IDs, including LREs and unusual speech acts. Alternative experimental designs would doubtlessly reveal even more 'causes'.

MAXIM 4: Time is of the essence. The current study was longitudinal, and focused on two different time scales, both long- and short-term.

MAXIM 5: Group generalizations often fail at the individual level. In Section 4.11, I illustrated that the 'grand sweep', or aggregated trajectory, was often not representative of individual trajectories.

[14] It is interesting to note that Maxim 6 (regularities are emergent), although not previously discussed because it does not bear on research design, directly applies to the discussion in the preceding section (Section 5.4).

MAXIMS 8 and 9: Learning is a conscious process and emergent consciousness is the 'stuff of learning' and is context dependent. The present study used a think-aloud protocol and collected data on other metacognitive markers, such as long pauses and evaluative statements within the text chat, in an effort to better understand the role of consciousness in the language learning/use process.

MAXIM 10: Cognition is socioculturally situated. "Learning is ever thus. It takes place in a social context, involving action, reaction, collaborative interaction, intersubjectivity, and mutually assisted performance" (Ellis & Larsen-Freeman 2006: 572). The present study attempted to situate the acts of self-reflective ID reporting, reading span testing and language learning within the context of real, unscripted (though perhaps conventional) NS-NNS interactions. I have argued repeatedly that contextual factors shape IDs just as IDs contribute to context and that different contexts imply different degrees of projected ID consistency.

In addition to adhering to the above maxims, the present study tried to address Gregg's (2010) call for (1) mathematical rigor, (2) a mechanism that discerns 'noisy' from relevant data, and (3) a clear understanding how studying component forces of a dynamical system is substantially different from reductionism (see Section 2.2). The numeric ID data gathered not only represented multiple facets of the learner/agent, but it also pointed to the interactions that were most destabilizing. In other words, the selection of which sessions were to be compared was done quantitatively, thus removing an element of researcher bias and allowing for a degree of 'noise' reduction.

Regardless of how faithfully this dissertation adhered to the tenets of DST, the question remains: was it a *useful* exercise? The answer to this question, I believe, is a qualified yes. Perhaps 'retrodiction' is less 'useful' than prediction, dynamical modeling is less 'useful' than purely quantitative modeling and multivariate, reciprocal causality is

less ‘useful’ than linear causality if by ‘useful’ we mean a construct that allows us to fully understand the present and anticipate the future. I have argued, however, that the reality we must face (regardless of the paradigm to which we subscribe) is that predicting a learner’s future state, indeed even fully mapping a learner’s present state, are elusive if not impossible tasks. The Heisenberg Uncertainty Principle states that the more we know about the position of a particle, the less we know about its momentum, and vice-versa. If we cannot accurately state these two conditions of a real, physical particle, then how could we possibly pinpoint a linguistic mental state that exists on so many dimensions? Is DST more ‘useful’? I would argue that it is at the very least more realistic and no less useful than other paradigms have proven to be.

5.6 LIMITATIONS

As with any qualitative study, the potential threats to the validity of the findings were numerous, and were compounded by the lack of ‘control’ exerted over the variables. Participants, such as Sandra, who was overcome with a feeling of ‘stupidity’ due to her lack of ability to engage in extended discourse, sometimes resorted to dictionaries/online tools to facilitate their interactions despite repeated instructions not to do so. Moreover, the interlocutors were not instructed to test any particular forms, assume any particular roles, or push the participants to complete any linguistic tasks. The reason was that the treatment was intended more as a communicative exercise, which is more representative of authentic initial (online) NS-NNS interactions, rather than guided practice.

Research bias is a real problem in conducting qualitative analyses of interactions, as I may have been unknowingly tempted to favor certain episodes over others on the basis that they supported my hypotheses. I took five measures to control against such

biases: (1) I used the statistically-significant short-term ID shifts to determine the sessions I analyzed; (2) in the sessions analyzed, I reported all episodes that stood out against the typical NS-interviewer/NNS-interviewee frame, providing transcripts in most cases to allow readers to draw their own conclusions; (3) I gave counts of events like topic nominations and exchanges to allow for quantitative as well as qualitative comparisons among the sessions; (4) I often checked sessions that were not analyzed to ensure that certain phenomena were unique to certain sessions; and (5) I tried to remain open to any patterns that might reveal themselves in the data rather than searching for any particular phenomenon.

The final major threat to internal validity would be the observer effect, which occurs when the mere act of observing an event can alter its nature. Participants were undoubtedly aware that their IDs were being measured and that their chat sessions and think-aloud comments were being recorded. My hope is that with time, they paid less attention to the measurement instruments and focused more of their attentional resources on the interaction themselves (as often happens on so-called television 'reality' shows). Nonetheless, the effect is always present and, in studies of this nature, impossible to eliminate. It may be argued that incorporating three modes of measurement (i.e. recording the text-based interactions, recording the think-aloud comments, and requiring the completion of multi-scale ID tests) was unnecessarily cumbersome or even redundant; however, each mode revealed a different dimension that often served to validate or contradict evidence gathered from another mode. For example, in Haley's case, there were several instances in which an LRE appeared to be resolved when the think-aloud data revealed that, in fact, it had not. In all, I believe that the richness of the data gathered justified the potential threats to validity posed by the methodology.

5.7 CONCLUSION

My overarching thesis has been that the agent or individual who engages in the language learning process is emergent just as their interlanguage is emergent. Moreover, the process of learning a foreign language through interaction, at least in the context of the present study, is momentous enough to impact a set of variables that define a learner just as those variables that define a learner impact both the learning situation and the interlanguage. Indeed, my thesis is that the learner and their (inter)language are *co*-emergent. DST provides a framework within which to analyze reciprocal relationships among different variables, offering an alternative to the more traditional, linear approach of assigning independent/dependent status to different variables. I would argue that such assignments are arbitrary and, furthermore, that 'control' over any particular variable is either utterly elusive or so contrived as to make the context within which the results are obtained incompatible with the context to which they are intended to apply.

I cannot claim that the present study is free of all reductionist vices; my own cognitive limitations make it impossible for me to fathom the full complexity of language learning. However, I have tried to take a step in a relatively new direction by (1) considering both the 'grand sweep' and the individual (cf. Thelen and Smith 1996) to reveal the fractal nature of interactive language learning, (2) treating variables, such as the various ID subscales, simultaneously as independent (they dictated the sessions that I analyzed) *and* dependent (I tried to discover how they might have emerged within the interactions themselves), (3) examining language learning within the broader context of *agent* and *language* (Dörnyei 2009), and (4) highlighting various time scales by looking at short-term versus long-term fluctuations in what I believe to be a compendium of emergent phenomena.

What resulted from my investigation were some surprising patterns: learners often favored saving face over embracing opportunities to learn through recasts and other LREs; pragmatically-salient events, such as NS apologies, were particularly apt to correlate with shifts in personality; and significant personality shifts tended to be unidirectional, among others. Whether such observations hold among different participants, given different tasks, remains to be seen. For now, I would propose the following, preliminary dynamical model to depict the relationship between agent and language learning on the conscious or metacognitive level (see Figure 8 below).

In constructing this model, I attempted to: (1) include most basic components of human consciousness (i.e. planning, monitoring and evaluating [Flavell 1979; Meijer, Veenman & van Hout-Wolters 2006]); (2) arrange these elements into nested or fractal processes (Baranger n.d.) that are iterative, thus allowing for the amplification of small disturbances, otherwise known as 'chaos' (Peitgen et al. 2004); (3) reflect models of fractal neural networks (Widjaja 2000); (4) allow for emergence of both language and IDs, with no beginning or endpoints; and, most importantly (5) fit the results of the present study, particularly the interplay between face-saving and language-learning strategies. This model is by no means intended to be comprehensive, as each process indicated in Figure 8 would be the cumulative effect of sub-processes and, likewise, the sub-process of another, superordinate process. Such is the nature of Dynamical Systems.

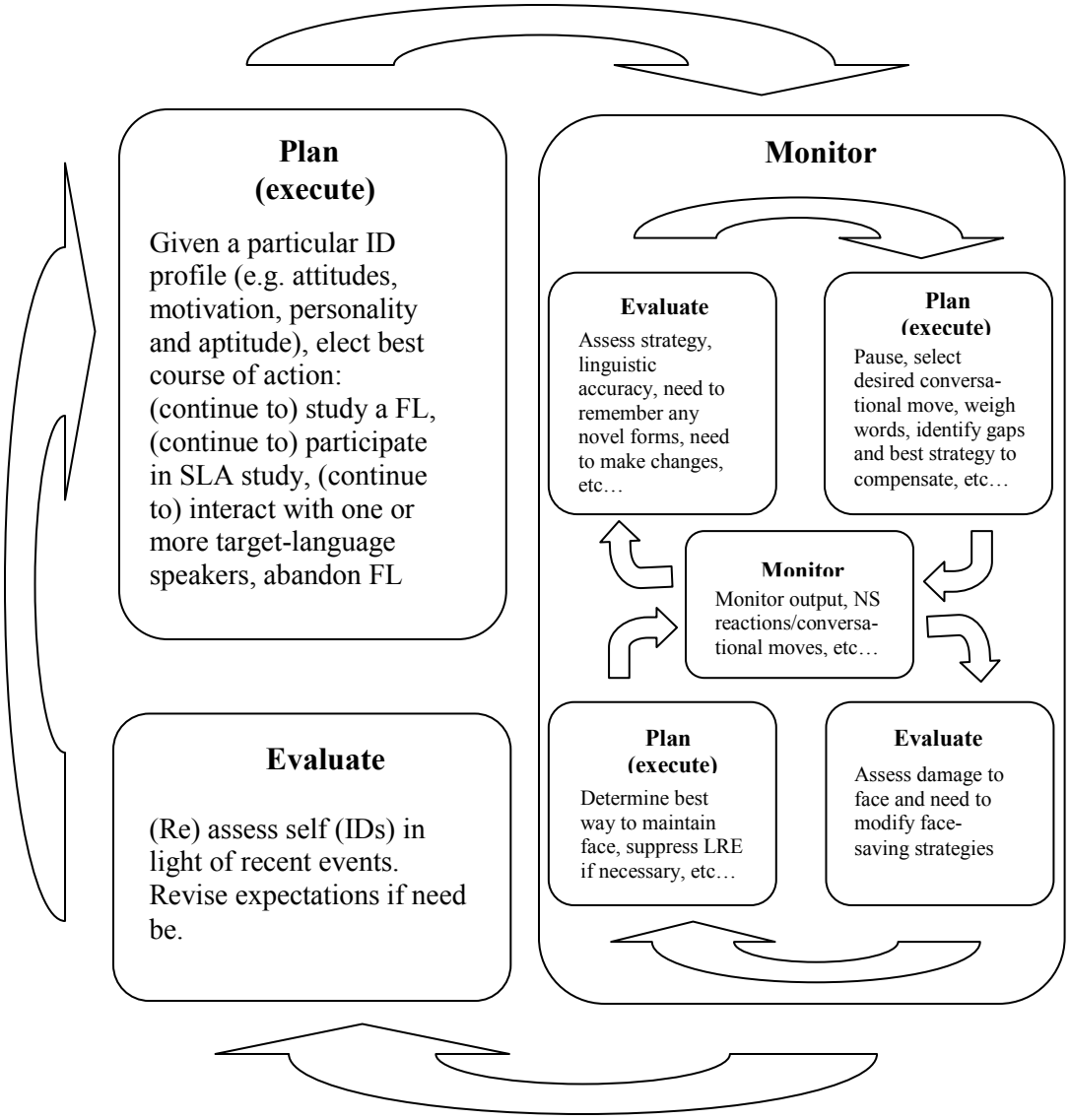

Figure 8: Dynamical model of the interface between learner (agent) and language learning process at the metacognitive level

Thus, the relationship between agent and language is not a linear, but rather a dynamical one in which the outcome of any particular episode serves as the input for subsequent episodes until such time as the learner's ID profile is no longer conducive to learning a language. It is tempting to think that the issue of engagement is simply a

matter of motivation, but such need not necessarily be the case. The 4 participants in this study who showed consistently high levels of motivation (i.e. Casey, Haley, Jessica and Erin) tended more often than not to be relatively highly conscientious (=BFI Subscale 2), with average levels ranging from 1.43 to 2.59. They also showed a near perfect 0.98 correlation between levels of openness and extroversion. The point is that different facets of a learner may interact in such ways that make it impossible to single out any one trait as a 'silver bullet' of language learning, especially when we look at learning across time and different contexts. The more likely scenario is that the system's components are *coupled* (i.e. mutually interactive), and that they are *continuous* (i.e. assembled in the moment given a certain history) (Thelan and Smith 2006).

Gardner, Tremblay and Masgoret (1997) proposed what they termed a 'full model of language acquisition' depicted in Figure 9 below.

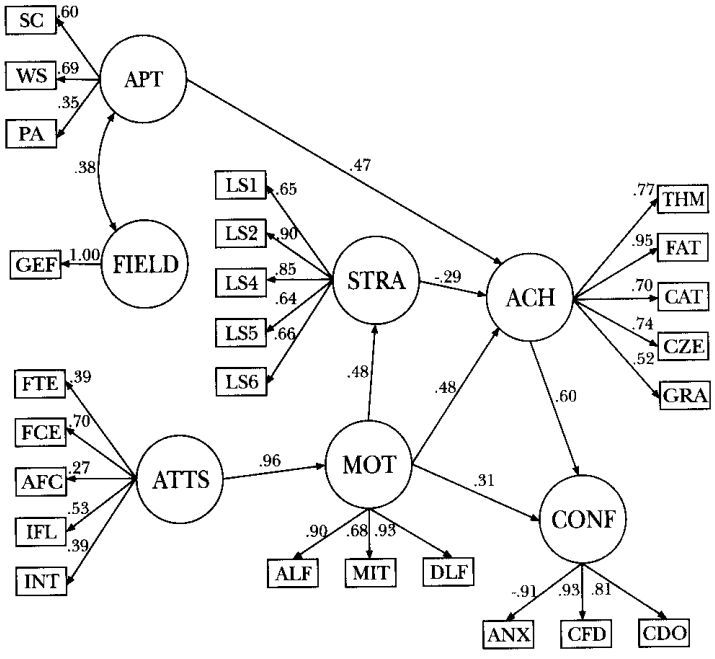

Figure 9: Gardner, Tremblay and Masgoret's (1997) causal model of language acquisition

The problem with models of this sort is that they are linear, static and achievement-oriented in addition to being particular to tutored learning contexts. Gardner et al. (1997) maintain that the factors that bear most heavily on achievement (ACH) (as measured by various formal tests) are motivation (MOT) and aptitude (APT). However, their model says nothing about the effect that achievement has on motivation and aptitude. Likewise, it says nothing about the adaptability/acceptability of the person to a particular target-language community, which would be very likely to affect the long-term prospects for sustained L2 achievement (cf. Kinginger 2004). Any dynamical model that accounts for change over time must allow for feedback loops (i.e. the genesis of fractals) in which different variables come to the fore as the context changes. Perhaps at a particular moment or phase of second language acquisition, a learner's motivation is critical to continued success in an academic setting; perhaps at another moment, their openness to new experiences is essential to their integration into a foreign-language speech community, and then perhaps their working memory is key to initial success in novel communicative situations. Different learner variables are thus called into play as the individual tries to devise make-do solutions for the particular problems/opportunities at hand and achievement is reframed not as a score on a test, but as continued and increasingly profound engagement with the language and its speakers.

This investigation suggests two main avenues for future research. The first involves further implementation and refinement of DST-oriented methodologies within the field of SLA, drawing, when necessary, from the wealth of DST research that exists in other fields. After the completion of the present study and the initial writing of this dissertation, Vespoor, de Bot and Lowie (2011) published an edited collection of eight papers that undertook just such a task, offering important insight into certain statistical

modeling techniques, as well as examining phenomena such as 'connected growers' (i.e. linguistic structures that form synergies) from a DST perspective. While not directly relevant to the present study, these developments represent a significant step forward. The second avenue of research involves closer investigation of any of the findings of this study, as many of them were unanticipated. Of particular interest are the apparently strong relationship between LREs and attitudes/motivation, as well as the potential reciprocal relationship between speech acts and personality traits. Many would intuitively agree that the type of person we are dictates the way we talk. At issue here is also the possibility that the way we talk bears upon the type of person we are.

Appendix A1: Instructions

You are being asked to participate in a research study. This form provides you with information about the study. The person in charge of this research will also describe this study to you and answer all of your questions. Please read the information below and ask any questions you might have before deciding whether or not to take part. Your participation is entirely voluntary. You can refuse to participate without penalty or loss of benefits to which you are otherwise entitled. You can stop your participation at any time and your refusal will not impact current or future relationships with UT Austin or participating sites. To do so simply tell the researcher you wish to stop participation. The researcher will provide you with a copy of this consent for your records.

This study seeks analyze the development of foreign language and learner traits over time. This study will include upwards to 26 participants.

If you agree to be in this study, we will ask you to do the following things:

- Complete questionnaires relating to your personality, motivation, language aptitude, and cognitive style.
- Interact via online "chat" with a Spanish speaker of native or near-native proficiency.
- Possibly speak your thoughts as you type (your speech would be recorded).

Total estimated time to participate is either 4 hours (without speech recording) or 8 hours (with speech recording). We will set up a schedule in writing prior to your first session.

Risks of being in the study:
This study may involve risks that are currently unforeseeable. If you wish to discuss the information above or any other risks you may experience, you may ask questions now or email the Principal Investigator listed on the front page of this form.

Benefits of being in the study: None

Compensation:
You will be compensated $7.50 per hour (prorated) provided that you attend the required number of sessions. We will agree to a schedule before the first session. You may be dropped from the study if you miss more than one session without rescheduling 24 hours in advance at a time that is convenient for both of us. If you are dropped from the study for this reason or for being generally uncooperative, then you will not be compensated and your data will be discarded. Payment will be made by check at the end of the final data collection session

Confidentiality and Privacy Protections:
You will not be asked to provide any contact information in conjunction with this study. Additionally, you will be assigned a "nickname" for your online interactions. PLEASE DO NOT REVEAL ANY INFORMATION WHICH YOU CONSIDER TO BE INAPPROPRIATE OR INCRIMINATING. If your interaction leads to a topic or question that makes you uncomfortable, please indicate this to your partner or to me. Any names you reveal will be altered to ensure privacy. You may leave at any time during this study, at which point I will confirm with you in writing that your data has been destroyed.

The data resulting from your participation may be made available to other researchers in the future for research purposes not detailed within this consent form. In these cases, the data will contain no identifying information that could associate you with it, or with your participation in any study.

The records of this study will be stored securely and kept confidential. Authorized persons from The University of Texas at Austin, members of the Institutional Review Board, and (study sponsors, if any) have the legal right to review your research records and will protect the confidentiality of those records to the extent permitted by law. All publications will exclude any information that will make it possible to identify you as a subject. Throughout the study, the researchers will notify you of new information that may become available and that might affect your decision to remain in the study.

Contacts and Questions:
If you have any questions about the study please ask now. If you have questions later, want additional information, or wish to withdraw your participation call the researchers conducting the study. Their names, phone numbers, and e-mail addresses are at the top of this page. If you have questions about your rights as a research participant, complaints, concerns, or questions about the research please contact Jody Jensen, Ph.D., Chair, The University of Texas at Austin Institutional Review Board for the Protection of Human Subjects at (512) 232-2685 or the Office of Research Support and Compliance at (512) 471-8871 or email: orsc@uts.cc.utexas.edu.
You will be given a copy of this information to keep for your records.

Appendix A2: ID Questionnaire

Question 00737210
I am someone who is talkative.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737211
I am someone who is full of energy.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737212
I am someone who generates a lot of enthusiasm.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737213
I am someone who has an assertive personality.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737214
I am someone who is outgoing, sociable.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737215
I am someone who is reserved.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737216
I am someone who tends to be quiet.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737217
I am someone who is sometimes shy, inhibited.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737218
I am someone who is helpful and unselfish with others.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737219
I am someone who has a forgiving nature.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737220
I am someone who is generally trusting.

- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737221
I am someone who is considerate and kind to almost everyone.

- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737222
I am someone who likes to cooperate with others.

- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737223
I am someone who tends to find fault with others.

- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737224
I am someone who starts quarrels with others.

- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737225
I am someone who can be cold and aloof.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737226
I am someone who is sometimes rude to others.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737227
I am someone who does a thorough job.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737228
I am someone who is a reliable worker.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737229
I am someone who perseveres until the task is finished.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737230
I am someone who does things efficiently.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737231
I am someone who makes plans and follows through with them.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737232
I am someone who can be somewhat careless.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737233
I am someone who tends to be disorganized.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737234
I am someone who tends to be lazy.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737235
I am someone who is easily distracted.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737236
I am someone who is depressed, blue.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737237
I am someone who can be tense.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737238
I am someone who worries a lot.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737239
I am someone who can be moody.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737240
I am someone who gets nervous easily.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737241
I am someone who is relaxed, handles stress well.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737242
I am someone who is emotionally stable, not easily upset.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737243
I am someone who remains calm in tense situations.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737244
I am someone who is original, comes up with new ideas.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737245
I am someone who is curious about many different things.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737246
I am someone who is ingenious, a deep thinker.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737247
I am someone who has an active imagination.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737248
I am someone who is inventive.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737249
I am someone who values artistic, aesthetic experiences.
- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737250
I am someone who likes to reflect, play with ideas.

- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737251
I am someone who is sophisticated in art, music, or literature.

- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737252
I am someone who prefers work that is routine.

- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00737253
I am someone who has few artistic interests.

- Disagree strongly
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree strongly

Question 00278627
Go to http://cognitivefun.net/test/21 MAKE SURE TO LOGIN using your St. Edward's email name (only the part that comes before the @stedwards.edu on your email address) and the password stedwards at the upper right corner of the window. The complete directions for completing the exercise are on the website. Feel free to click on the demonstration link to practice before moving on to the main exercise. You will be presented groups of sentences which you will need to retype and remember final word. Each level contains three groups of sentences. If you succeed at remembering the final words of all three groups of sentences, you will be allowed to move on to the next level. If you do not remember all of the final words, the computer will give you a final score without letting you move on to a higher level. Please enter the highest level you reached (the resulting span) here [L] and the percent correct (% correct) for that level here [S]. NOTE: if your percent correct is 100%, you should move on to the next level. Only enter the scores for the final level. You should not repeat any levels.

Question 00668251
Spanish is really great.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668252
I really enjoy learning Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668253
I love learning Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668254
I plan to learn as much Spanish as possible.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668255
I think that all American Universities should teach Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668256
I hate Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668257
I would rather spend my time learning things other than Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668258
I find learning Spanish very boring.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668259
Learning Spanish is a waste of time.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668260
When I finish taking my required Spanish courses, I will give up the study of Spanish entirely because I am not interested in it.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668261
I wish I had begun studying Spanish at an early age.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668262
If it were up to me, I would spend all of my time learning Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668263
I want to learn Spanish so well that it will become second nature to me.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668264
I would like to learn as much Spanish as possible.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668265
I wish I were fluent in Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668266
Knowing Spanish isn't really an important goal in my life.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668267
I sometimes daydream about dropping Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668268
I find I'm losing any desire I ever had to know Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668269
To be honest, I really have little desire to learn Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668270
I haven't any great wish to learn more than the basics of Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668271
I make a point of trying to understand all the Spanish I see and hear.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668272
I keep up to date with Spanish by working on it almost every day.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668273
When I have a problem understanding something in Spanish, I always ask for help.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668274
I really work hard to learn Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668275
When I am studying Spanish, I ignore distractions and stick to the job at hand.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668276
I don't pay too much attention to the feedback I receive when learning Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668277
I don't bother checking my corrected assignments in my Spanish courses.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668278
I tend to approach my Spanish tasks/assignments in a random and unplanned manner.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668279
I have a tendency to give up when my Spanish instructor goes off on a tangent.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Question 00668280
I can't be bothered trying to understand the more complex aspects of Spanish.

- Disagree strongly
- Disagree Moderately
- Disagree a little
- Neither agree nor disagree
- Agree a little
- Agree moderately
- Agree strongly

Appendix A3: List of Acronyms

AMTB: Attitude Motivation Test Battery
BFI: Big Five (Personality) Inventory
DST: Dynamical Systems Theory
ID(s): Individual difference(s)
LRE: Language-related episode
NNS: Non-native speaker
NS: Native speaker
SLA: Second language acquisition

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